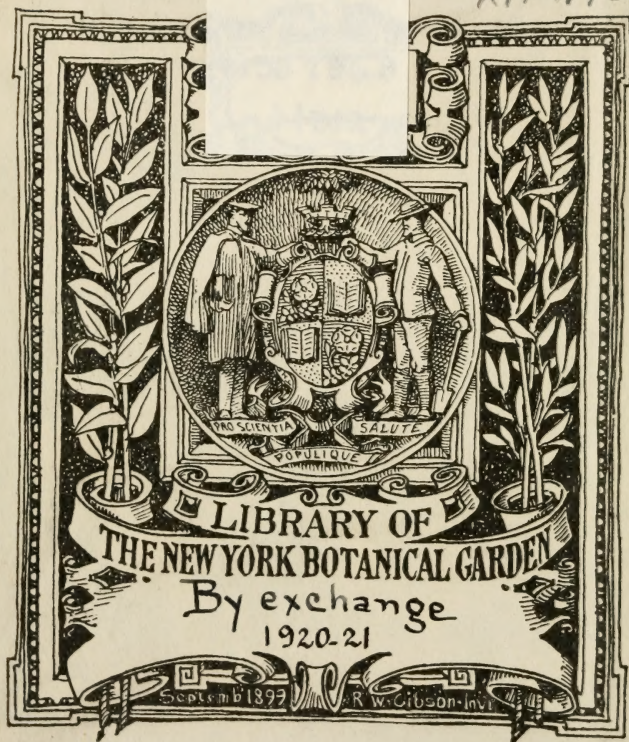






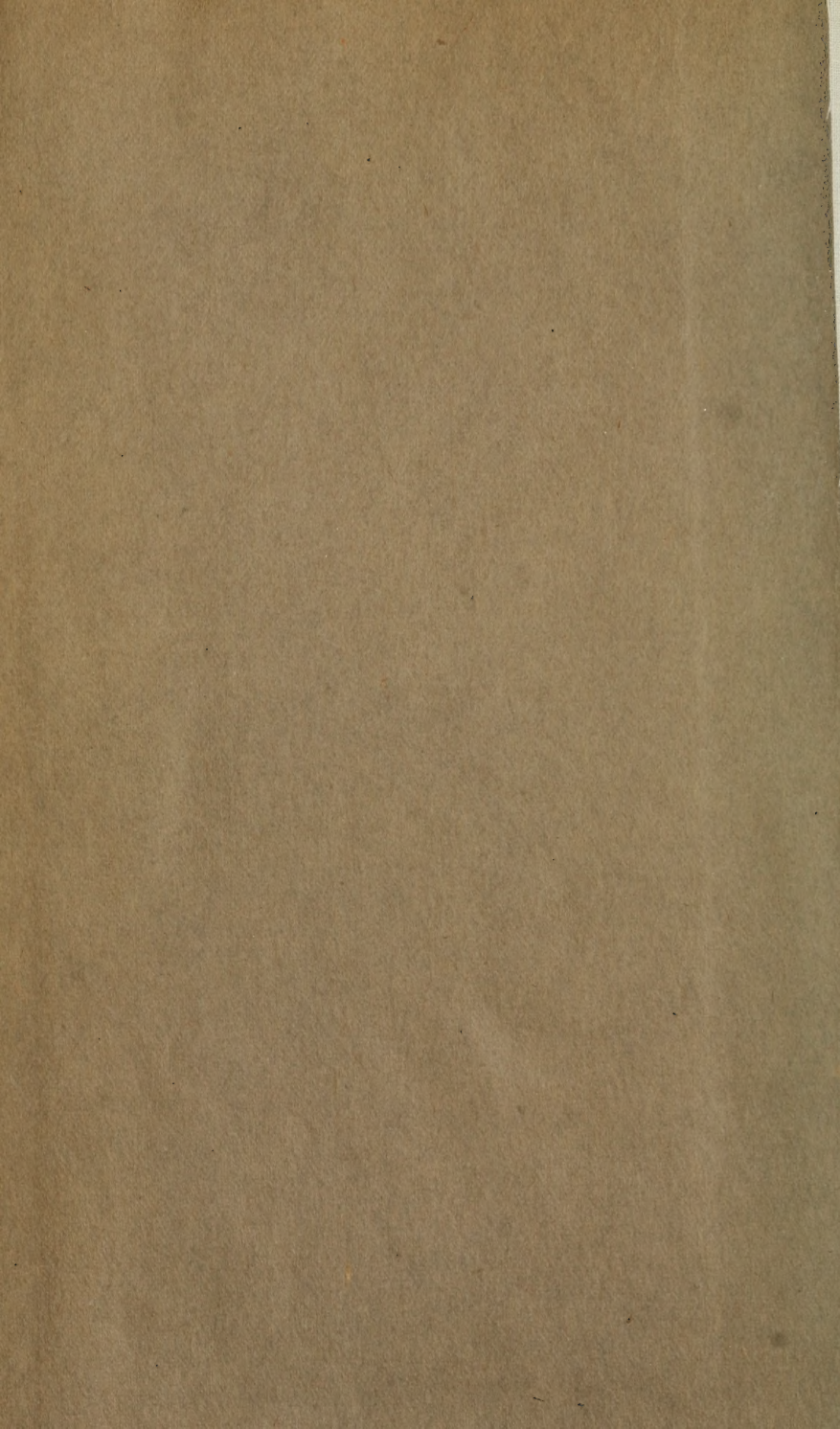
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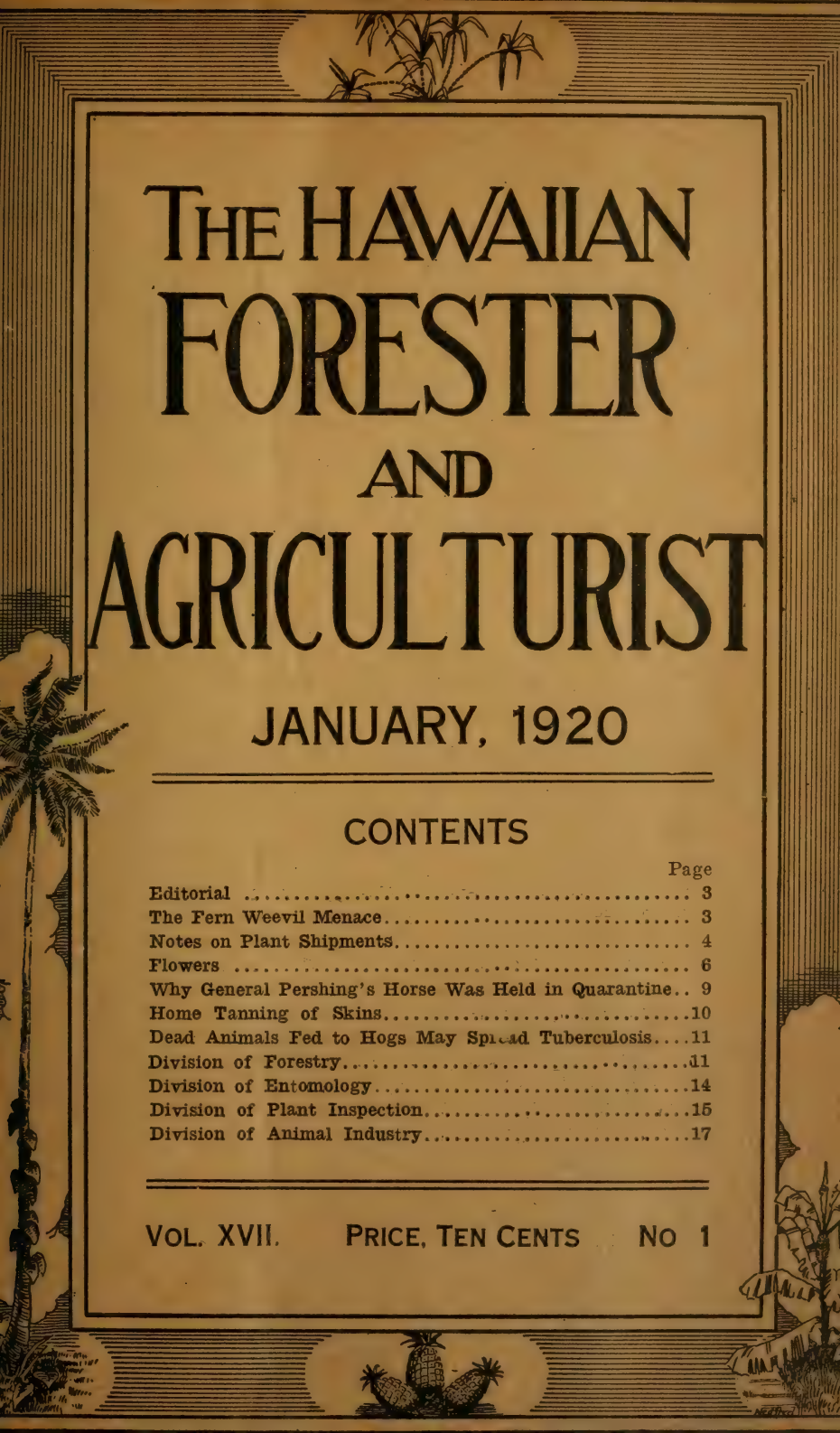
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# Board of Agriculture and Forestry

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C. S. JUDD,  
Superintendent of Forestry.

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D. T. FULLAWAY,  
Entomologist.

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# THE HAWAIIAN FORESTER AND AGRICULTURIST

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No. 1

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With the present high price paid for hides, the article in this number on the subject of tanning may be found of timely interest.

It is satisfactory to know that trees such as the Australian red cedar and the Bermuda juniper, introduced into these islands in comparatively recent times, are now so well established as to produce seed which is available for propagation purposes.

The article in this number entitled "Flowers" is reproduced by permission of the author, Mr. R. I. Lillie, whose success in growing ornamental flowers has resulted in one of the most beautiful yards in Honolulu. His directions for raising plants are based on actual experience and will be found of great value to those desiring to have a flower garden.

The Entomologist's article, in this issue, on the infestation of the Australian fern weevil, calls attention to the serious results which may possibly follow if the invasion is allowed to remain unchecked. Household-ers may help in the work of eradication by destroying all discovered weevils and the ferns which they are infesting, and by refraining from moving any ferns from one locality to another.

The Chief Plant Inspector points out in this number the feasibility of shipping plants in a bare root condition from Oahu to the other islands, provided they receive the proper care. Recently the Division of Forestry shipped by mail 120 Norfolk Island and Kauri pine trees to Hilo, packed in damp moss. They were seven days in the box before being opened and were then found to be remarkably fresh and in good condition.

---

## The Fern Weevil Menace

BY D. T. FULLAWAY, *Entomologist*.

Brief mention was made in the October *Forester* of the discovery, in September, of a serious infestation of the beautiful Sadleria ferns in the neighborhood of Kilauea by the Australian fern weevil, *Syagrius fulvitaris*, and of the efforts made to

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suppress it. With the result of this undertaking still uncertain, a more troublesome situation is disclosed. The weevil, it is found, has escaped from one or two greenhouses in Hilo, to which it was supposed to be confined, and has spread all over the city, from Wainaku to Waiakea, on the fish-tail fern. It does not appear feasible to eradicate it in so extensive an area, and the only control measure which recommends itself at present is isolation, which may serve to protect the forests from invasion for a period. At all events, the possibility of invasion is no longer remote, and it seems important to consider now what the consequence would be should this beetle succeed in securing a firm foothold in the forests.

An examination of the *Sadleria* ferns in the mountains back of Honolulu, where the beetle has been present for 15 years, reveals the destructive nature of the insect. The fern growth there is thin, compared with that at Kilauea, yet it is impossible to find a single plant that has not suffered severely from the ravages of the beetle. As the attacks appear to be continuous, it seems certain that the ferns, in spite of their hardiness, will eventually succumb. At Kilauea, the shattered condition of the ferns was more noticeable on account of the thickness of the stand. In these dense forests, ferns constitute an important part of the ground cover. It is to be expected that their destruction will be followed by a train of attendant evils, such as the entrance of light, drying of the ground, the invasion of weeds, etc. The sensitiveness of the Hawaiian forests to disturbance is so well known that the result can be definitely predicted—a progressive debility of the trees on the edge of the invaded areas, a dying back of the forest, ultimately its extinction. It would seem necessary, therefore, to make every effort to prevent the fern weevil from gaining further access to the forests.

Illustrations of the different stages of the fern weevil accompany this article.

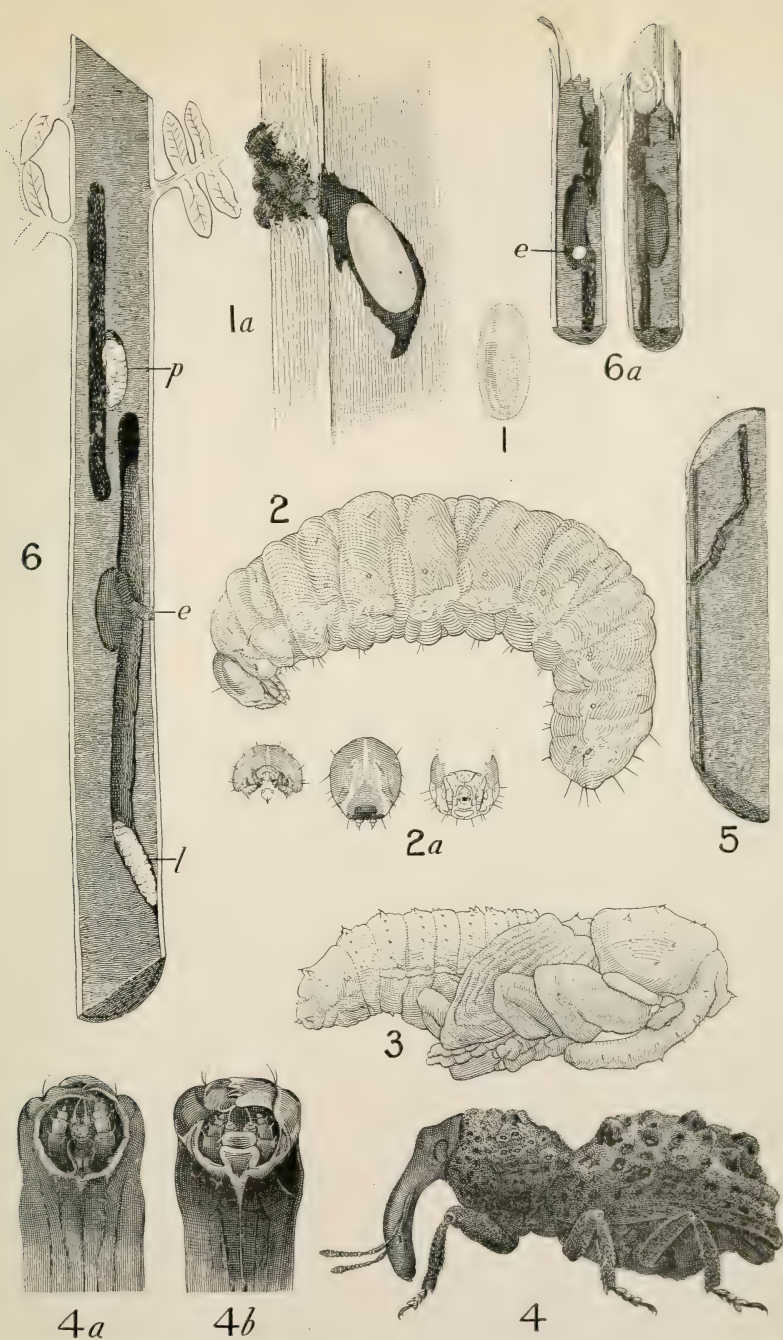
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## Notes on Plant Shipments

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BY E. M. EHRHORN, *Chief Plant Inspector.*

Since the approval of Rule XX of the Division of Plant Inspection, which concerns inter-island shipments of plants, fruits, vegetables, sugar cane and other vegetable products, much inquiry has come to the Division regarding the requirement necessary for the shipment of these commodities. The public does not seem to appreciate the importance and necessity for the rules and regulations which the Board of Agriculture and Forestry promulgates. When we consider that Honolulu is the important port of entry for all the islands where vessels enter from foreign countries which are either bringing cargoes here for home use, or which call here for bunker fuel, provisions and water while in



THE FERN WEEVIL, (*Syagrius fulvitaris* Pase.)—1, egg (greatly enlarged); 1a, section of fern stem showing egg-chamber (greatly enlarged). 2, larva; 2a, head of larva from front, above, and beneath, showing mouthparts (x10). 3, pupa (x10). 4, adult weevil (x10); 4a, b, apical extremity of rostrum showing mouthparts (greatly enlarged). 5, section of fern stem showing gallery of freshly-hatched larva (somewhat enlarged). 6, section of fern stem showing galleries of more advanced larvae and pupal chamber with exit; l, larva, p, pupa, e, exit (somewhat enlarged); 6a, portion of the preceding in greater detail.





transit, we must at once realize that the danger of introduction of some insect pest or plant disease is more liable at this port than anywhere else in these islands. This being the case, and to avoid the possible spread of such insects which might gain a foothold on Oahu, to any of the other islands, Rule XX was approved on June 1, 1919.

There need not be any anxiety for loss or destruction on the part of the shipper of any commodity in this rule if he complies with the regulations noted therein. Any infested fruit, plant, vegetable or other material of a vegetable nature will not be allowed shipment to the other islands. No sugar cane, even when desired as food on the trip to the other islands, will be permitted shipment, unless it has been first examined and properly tagged by the plant inspector. All taro, lily root and tubers cannot be shipped unless they have first been cleaned from clinging soil and properly tagged by the plant inspector.

All plants from the roots of which the soil has been washed off, when free from scale insects and diseases, can be shipped when properly tagged by the plant inspector. Any plant not so treated and found in the possession of a passenger will be seized and forbidden shipment.

Soil is the greatest carrier of disease germs and insect pests, especially in their immature stages. The Japanese rose beetle, anomala beetle, ants and many other pests were brought to these islands in soil many years ago and, since the inspection laws have been enforced, the grubs of the above pests have been found on several occasions in the soil of plant shipments from foreign countries. Not very long ago, in the soil of a medium-sized pot plant from Japan, 122 grubs of a beetle similar to the Japanese rose beetle were found. Had this plant not been stopped by the plant inspector, we would without doubt have had another serious pest to contend with.

Many people have an idea that shipping plants without soil means the death of the plants. As in all things, there is a right way and a wrong way to pack and ship plants. Even some of the nurserymen and florists do not seem to know how to ship plants by mail from the mainland to Hawaii. Frequently we find young rose plants in cardboard boxes or wrappers crushed flat by the weight of the mail bags, and the plants dead and as dry as a bone. These same persons send such plants to nearby towns in their state, and yet do not realize that from the far eastern states to Hawaii it takes two weeks with two or three handlings before the plants arrive here. Their attention has been called to this matter, but very few seem to improve the conditions. The Division of Plant Inspection will gladly verify the arrival of poorly packed plants and individuals need not lose their money. If a plant is carefully handled, the soil carefully removed, preferably by washing it off so as not to injure the tender rootlets, and is then packed in well-moistened moss and each plant carefully wrapped by itself, there should be no loss in such shipments.

Many people just shove a plant into a box without moss or anything moist, expecting the plants to arrive in good condition, with the result that in most cases the plant dies.

Another important matter in shipping plants from which the soil has been removed, is that after planting them in the open where the hot sun can reach them, good protection should be given the plants with a covering for a few days until they can get established. Very tender plants can be repotted and kept in the shade for a few weeks, and then transferred to the garden in a permanent place.

These suggestions are very important and should be well considered by those who contemplate shipping plants. The plant inspector's office is located on Kekuanaoa street at the rear of Lucas' mill, Honolulu, where all information regarding the importation and shipping of plants, fruits, vegetables, seeds and all agricultural products can be obtained.

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## Flowers\*

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BY R. I. LILLIE.

The highest success in flower growing presupposes perseverance and constant daily attention. He who is not prepared to give this need expect only failure or at best mediocre results. But the gardener who gives such attention and follows simple principles will be surprised at the richness of the beauty which will reward his efforts.

I find there are four S's to be very carefully considered, namely:

*Seasons.* I begin sowing my seeds for spring flowers as early as November and keep on sowing at intervals to the end of June. After that date, the weather generally gets hot and dry, and, with the exception of a few fall flowers, such as cosmos and dahlias, I find that, as a rule, poor results follow. The hot weather forces the flowers into bloom without their gaining full development and growth, and the results are very unsatisfactory.

Our season here is at least two months earlier than California and four months earlier than the Eastern States. This has to be carefully considered, as sowing seeds out of their proper season will get but little response from the plants. I have heard a local store man selling seeds to a lady and stating that we have no seasons here and that you can sow seeds all the year around in this climate and get good results. This is not so, and nothing is more discouraging to a gardener than to find seeds dried out and failing to germinate or producing spindling little plants with puny flowers merely because the seeds were planted out of season. A plant always tries to catch up with its proper season; for instance, sow cosmos in the early spring, and it will bloom before



it is a foot high, whereas if it is sown in June or July, it will often grow to six feet.

In most catalogues, you will find lists of flowers that should be grown in certain months, but it is well to remember that these lists are intended for the Eastern States mostly, so that for this climate you will have to advance the seasons accordingly.

*Seeds.* This is the all important matter, especially in this climate where seeds, if kept even a few weeks, lose all vitality. Any housekeeper knows that most of the cereals used in homes get weevily or musty in a very short time. I send East to one of the reliable growers of seeds a list of my wants in the seed line about the end of October and instruct them to forward them in installments as the new seeds come into market, and are ready to send out. I do not limit them in price, but ask that only the *best and freshest, and tested seeds be sent*. There are many reliable seedsmen and it is important to locate a few who can be depended upon to fill orders for fresh stock only and then place your order with them. If you have not had experience, inquiry of someone who has been growing flowers or of the Experiment Stations or the Board of Agriculture and Forestry will result in your receiving addresses of several firms, who are known to sell good seeds. H. May & Co., C. J. Day & Co., and probably other Honolulu dealers are willing to order seeds for you from any house that you may prefer if you wish to order through a local dealer. A special order usually brings far better seeds than those that are placed on the general market in packets.

It is a good plan to test seeds for yourself. Take a damp sheet of blotting paper and sprinkle on it a few seeds, then put another sheet of blotting paper over it, damp it also, keep it moist on a plate for a few days, and if there is any vitality in the seeds they will germinate between the sheets. If you count the seeds you can get the percentage of germination. If the seeds do not show any vitality, poor results will follow sowing. Two years ago I got one ounce of Pansy seeds from Boston; I intended to make several sowings to get a rotation of flowers. The day after the arrival of the seeds, I sowed one box. I estimated 90% grew. Three weeks later, I sowed another box from the same package, and got less than 50% plants, and two weeks later still, I sowed the balance and did not get 10%. This has been my experience with most seeds. To get results, get only *new, fresh seeds*, and sow immediately on arrival.

*Sowing.* I start most of my seeds in shallow boxes on benches protected from ants. The ants dearly love such seeds as pansy seeds, and if they can get at them, will dig up the last one of them. You may try this by spreading a few pansy seeds on the ground where ants frequent, and you will soon see them being packed away for future use in their storehouse. The boxes I use are about four inches deep, with small holes in the bottom for drainage. I fill in about three inches of finely sifted soil composed of about one-half well washed sand and one-half leaf

mould, well mixed. Press down firmly with a smooth piece of wood. Sprinkle thoroughly with boiling water to kill ants and other pests, and when cool sprinkle the seeds on the flat surface. Cover very lightly with finely sifted soil, but see that all seeds are covered, then press down again firmly. The greatest mistake is to cover the seeds too deeply. I have seen people sowing seeds and covering them an inch and a half deep. These seeds could never get through, and the planters were wondering why they did not come up. The seed books say that seeds should be covered only five times the diameter of the seeds, and I find a light covering more successful than a heavier. In sowing some of the very fine seeds I smooth out the soil carefully, spread a sheet of white tissue paper on the soil, and sprinkle the seeds on the paper, putting another sheet of tissue paper on top, and a slight covering of very fine soil over this. The paper below prevents the seeds sinking too deeply into the soil, and the top sheet prevents the seeds being disturbed while they are sending out their tiny roots. It is very important that seeds, while germinating, should not be disturbed, and as long as the soil keeps moist, avoid watering, but if the soil becomes dry, I use a fine sprayer, such as florists use or a tin one that is used to spray insects. One that makes a mist is best. Some sow seeds in shallow flower pots and place these in a saucer with water so the soil is kept moist from below by the water in the saucer. I also cover the seed boxes with cotton frames to keep from the sun. This helps to keep the soil moist, for if the sun dries out the surface of the soil, in all probability, the seeds will be killed. When the young plants are too crowded in the boxes, prick them out and plant in other boxes till ready to transplant into the garden. I generally change when the young plant has four leaves, and transplant later, when, say two inches high, but only experience can tell you how to treat each individual plant. Some are delicate and some are robust. Seedlings like Shirley Poppies, are very hard to transplant and should be sown where they are to be grown.

*Soil.* To have a good garden, you must thoroughly dig and turn over the soil to the depth of at least two feet. Most of my garden has been trenched to the depth of three feet. Also the soil must be pulverized and aired by being thoroughly raked. In this climate and soil, fertilizer is an absolute necessity in the gardens, as it is in the cane field. I see gardens in this city that do not seem to have been fertilized for years, and no wonder plants are stunted and hard to grow. Every fall, I dig my garden deeply, and give it a generous amount of old, rotted cow manure or horse manure. I generally have my supply on hand six months before using it. If commercial fertilizer is to be used to supplement the manure it must be applied with judgment, for disastrous results will follow excessive applications. I keep a little bone meal and lime for my personal use on the soil, but never entrust it to any employee.

Plant out your young plants in the late afternoon, so as to give them the cool night to get located and established. I have seen people planting out young plants in the blazing sun, and not watering them for hours. I always water as I plant out. In watering gardens, I see the yard boys sprinkling the surface and know that the water does not penetrate two inches and never reaches the roots. It is better to give a garden a good soaking once a week than a daily imitation of a watering which dries out in a few hours. Get the water deep into the soil. As soon as the flowers are done blooming cut them off. If the dead flowers are not removed from the plant, it will soon cease blooming. Vegetables, I treat in the same manner, but there is not so much necessity to start in boxes, as the seeds are usually larger and harder than flower seeds, but I raise lettuce, parsley, celery and onions in boxes first, and then plant out.

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### WHY GENERAL PERSHING'S HORSE WAS HELD IN QUARANTINE.

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When it became known in New York and Washington that General Pershing would not be allowed to make his triumphal march through the principal thoroughfares of the many cities, which had prepared a glorious "Welcome Home" for him, at the head of the returning heroes, mounted on his famous horse, "Kidron," on which thousands of officers and men had seen him throughout his campaigns in France and Belgium, so many protests against "Kidron" being sent to quarantine were voiced, that the Federal Department of Agriculture felt constrained to issue to the press a circular of information, from which the following paragraphs are quoted:

"Kidron," the horse that General Pershing rode to victory in the world war, began his career as a laurel wreath collector by getting in quarantine.

It is not that "Kidron," so far as anybody knows, has any infectious disease, but simply that he may have any equine disease, he must stay at the port of entry for five months, until the government veterinarians know that he is a safe animal to be at large. "Kidron" will remain at Newport News for 140 days.

The position taken by the Department of Agriculture is that, under no circumstances, can sentiment be permitted to interfere with the protective measures that have been worked out, slowly and sometimes precariously, for the protection of the livestock interests of the country. "Kidron" might possibly be affected with glanders or farcy, dourine, distemper or strangles, epizootic lymphangitis, or some other disease which may or may not be present in the United States. But, whether or not the disease that he might have exists at this time in this country, the probability would be that, traveling around the country as he would,



any contagion carried by the horse would be spread by him to such an extent that it would cause possibly millions of dollars of damage.

"Kidron" would have been rather an exceptionally dangerous horse to turn loose. The private's horse is picketed up at the front or at camp, under the supervision of the army veterinarians, and is pretty carefully guarded from contagious diseases. "Kidron," on the other hand, went wherever his master chose to ride him and may have touched noses with any number of French horses having any kind of contagious disease.

If "Kidron" were released from quarantine, he would probably visit scores of cities throughout the country, and if he had a disease, might spread it beyond all reasonable possibility of eradication. For these reasons, the Department of Agriculture thought it wise not to create any sort of favored status for him.

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## HOME TANNING OF SKINS.

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When it is desired to preserve the skins of wild animals which have been shot or trapped, these may be tanned either with the hair on or off, as desired. Hair can be removed from hides by soaking them in tepid water made alkaline by lye or lime. The following recipe for a tanning liquor is furnished by the Biological Survey of the United States Department of Agriculture: To each gallon of water add one quart of salt and one-half ounce of sulphuric acid. This mixture should not be kept in a metal container. Thin skins are tanned by this liquor in one day; heavy skins must remain in it longer. They may remain in it indefinitely without harm.

When removed from this liquor the skins are washed several times in soapy water, wrung as dry as possible, and rubbed on the flesh side with a cake of hard soap. They are then folded in the middle, hung lengthwise over a line, hair side out, and left to dry. When both surfaces are barely dry, and the interior is still moist, they are laid over a smooth, rounded board and scraped on the flesh side with the edge of a worn flat file, or a similar blunt-edged tool. In this way an inner layer is removed and the skins become nearly white in color. They are then stretched, rubbed and twisted until quite dry. If parts of a skin are still hard and stiff, the soaping, drying and stretching process is repeated until the entire skin is soft. Fresh butter, or other animal fat, worked into skins while they are warm, and then worked out again in dry hardwood sawdust, or extracted by a hasty bath in gasoline, increases their softness.

## DEAD ANIMALS FED TO HOGS MAY SPREAD TUBERCULOSIS.

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Warning against the feeding of diseased cattle carcasses to hogs is sounded by the United States Department of Agriculture. A conference of state and federal officials, held early in October, to deal with matters of tuberculosis eradication, brought to light numerous instances where hogs contracted tuberculosis after feeding on carcasses of tuberculous cattle. In one case nearly an entire drove of hogs showed lesions of tuberculosis, which at first the owner could not account for. Later he admitted to the veterinarian investigating the case that several months before he had fed to the hogs the carcass of a cow that "never did very well."

The Bureau of Animal Industry urges livestock owners to have a careful autopsy made on animals dying on the farm or killed because of sickness, in order that the definite cause of trouble may be learned. Carcasses that show lesions of infectious diseases should not be fed. Instead such carcasses should be cared for so that no part can be eaten by hogs. Thorough destruction of the carcass by burning, or by deep burial under a liberal application of quicklime, is the proper procedure in such cases. Attention is called also to the danger of feeding offal from slaughtered animals to swine, as such a practice is another source of infection.

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## Division of Forestry

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Honolulu, Hawaii, December 6, 1919.

Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—I respectfully submit the following routine report of the Division of Forestry for the month of November, 1919:

### TREE PLANTING.

Owing to the continued dry weather, reforestation on the reserves was confined to the planting of 717 koa trees in Makiki and 1050 bloodwood trees in Mikilua, a total of 1767 trees. At the Waiahole nursery several hundred kauri and Norfolk Island pine trees were transplanted into tins in preparation for the planting out on the land that is now being cleared for this purpose.

### KAPAA NURSERY.

Through the offer of Mr. G. S. Raymond, principal of Kapaa school, Kauai, an opportunity has been presented to supply a part of the demand for trees for planting out on Kauai, by the use of the 600 school pupils whom Mr. Raymond desires to secure experience in the practical work of tree raising. Many of these children come from homesteads where trees are desired, and in this way the demand can be supplied very advantageously. A supply of shooks for 50 seed boxes, nails,

screens for preparing the soil, and seed has been sent to Mr. Raymond for this purpose.

#### ARBOR DAY.

On November 20, I gave a lunch talk before the Rotary Club on Arbor day, which was celebrated on November 21 by fitting exercises in most of the public schools. The distribution of trees from the Government Nursery for planting out on this day on Oahu only amounted to a total of 6292, of which 1390 trees were called for in person by school children.

#### ADVICE ON TREE PLANTING.

On November 10, I accompanied officials of the Outdoor Circle to Schofield Barracks and assisted in giving advice and suggestions to General Hodges and Colonel Dashiell concerning the beautifying of the new officers' quarters by the planting of trees and shrubs.

Suggestions were also given to Major Holland of Fort Armstrong concerning the use of hedge plants for camouflage purposes.

#### KAUAI TRIP.

From November 3 to 8, I was on Kauai with the Governor and president of the Board of Health making an inspection of the Kokee camps. These were found to have been all cleaned up and Dr. Trotter personally gave advice on the ground to the permittees as to the further precautions which should be taken to guard the purity of the water in the Kokee streams so that camping could be continued. A few new sanitary clauses will soon be suggested by the Board of Health for inclusion in the camping permits, and during the next camping season a Board of Health inspector will make fortnightly rounds of the camps.

On this same trip arrangements were made to secure a supply of koa seed, which was found in abundance at the head of Waimea canyon at an elevation of 3500 feet. A few dozen seeds were also obtained from the only known tree in existence of the Kauai variety of the *Kokia* or native red cotton tree, *Kokia Rockii Kauaiensis*, which was found in Kahoaloha valley, mauka of Mana.

#### GRASS CUTTING.

On account of the complaints voiced by Tantalus residents against the use of the Round Top road by grass wagons, all grass cutting on government lands on Round Top and Tantalus has been absolutely stopped. A few wagons will go up there, however, to remove grass cleared off the road by the prison gang and grass taken by permission from privately owned land. The Division of Forestry has no jurisdiction over such grass removal. Incidentally, it may be mentioned that this grass goes to the small dairies in the Kapahulu district which have been a standby in furnishing a large part of the milk supply of the Dairy-men's Association.

Respectfully submitted.

C. S. JUDD,

Superintendent of Forestry.

#### REPORT OF FOREST NURSERYMAN:

Honolulu, Hawaii, November 30, 1919.

Superintendent of Forestry, Honolulu, T. H.

Sir:—I herewith submit a report of the principal work done during the month of November, 1919.



## NURSERY.

## Distribution of Plants:

	Trans- plant Boxes	Seed Boxes	Pot Grown	Total
Sold .....	150		41	191
Gratis * (including for- est reserves) .....	910	2800	30	3740
Total .....	1060	2800	71	3931

## ARBOR DAY.

The total number of plants distributed for Arbor Day planting amounted to 6292. The distribution of plants was as follows:

9 schools received .....	553 trees
1390 children called at Nursery on Arbor Day and received 1 tree each .....	1390 trees
58 people applied by letter, the number of trees or- dered being .....	1232 trees
182 people called at Nursery and gave orders, amount- ing to a total of .....	3117 trees
Total .....	6292 trees

## COLLECTIONS.

## Animal Industry Revolving Fund:

Laie Plantation (on account of swine plague).....	\$ 49.25
Princeville Plantation (on account of anthrax).....	399.00
	<hr/>
	\$448.25

## Government Realizations:

Collections on account of plants sold.....	\$ .80
Rent of office building Nursery grounds for October....	35.00
	<hr/>
Total .....	\$35.80

## COLLECTING SEED.

The writer, accompanied by two seed boys, spent a day collecting seed at Kunia. A number of the eucalyptus trees planted by Mr. van Valkenburg are now bearing seed. The red cedar of Australia, *Cedrela Australis*, first introduced by Mr. van Valkenburg about eight years ago, is also bearing. Mr. van Valkenburg at that time received 200 young trees which we cared for at the Nursery here until they recovered from the effects of the voyage. Later we received from Mr. E. C. Smith a package of seed of the red cedar which we propagated, distributing the plants to a number of people on the different islands. These trees have also started to bear seed.

We have tested the seed and found it good. The *Cedrela Australis* is classed as one of the most valuable timber trees in Australia. It attains a height of 200 feet and a girth of 18 feet.

Another tree of recent introduction and also bearing fertile seed, is the *Juniperus Bermudiana*, introduced by Mr. Gerrit P. Wilder nine years ago. Trees of this species planted on the trail leading from Makiki Station to Sugar Loaf hill are now about 15 feet high with a stem of from four to six inches at the butt.

*Juniperus Australis*, another valuable forest tree, is showing signs of

fruiting. This tree is also of recent introduction, the first seed of this species having been received from Jamaica through our exchange system about seven years ago.

#### PLANTATION COMPANIES AND OTHER CORPORATIONS.

The number of trees distributed under this heading amounted to 1000 pot grown plants.

#### MAKIKI STATION.

The work done at this station was principally routine. We are getting ready for the planting season and have a large quantity of trees ready.

#### HONOLULU WATERSHED PLANTING.

Koa trees to the number of 717 were planted in Opu valley during the month. Trails around Sugar Loaf hill were cleared.

#### ADVICE AND ASSISTANCE.

The writer has made the following number of calls and given advice and assistance otherwise, at the request of people in and around the city:

Calls made .....	6
Advice given by phone.....	4
Advice to people calling .....	9

Respectfully submitted.

DAVID HAUGHS,  
Forest Nurseryman.

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## Division of Entomology

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Honolulu, Hawaii, November 30, 1919.

Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—During the month the insectary handled 25,600 pupae of the melon fly, from which there were bred 3756 females and 2435 males, *Opius fletcheri*.

The distribution of parasites was as follows:

#### MELON FLY PARASITE.

##### *Opius fletcheri*.

Oahu:

	Females.	Males.
Moilili .....	2050	1980
Wahiawa .....	500	450

Hawaii:

Kamuela .....	200	200
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## FRUIT FLY PARASITES.

*Diachasma tryoni.*

Oahu:		
Kalihi valley .....	400	350
Waipahu .....	150	150
Hawaii:		
Kohala .....	20	20
Maui:		
Paia .....	100	100

*Tetrastichus giffardianus.*

Oahu:		
Kalihi Valley .....	500	
Wyllie Street .....	200	
Waipahu .....	1000	
Maui:		
Paia .....	400	

*Dirhinus giffardi.*

Oahu:		
Nuuanu .....	900	

*Galesus silvestri.*

Oahu:		
Nuuanu .....	1600	

*Opius humilis.*

	Females.	Males.
Oahu:		
Kalihi .....	50	50
Wyllie Street .....	25	25

*Diachasma fullawayi.*

Oahu:		
Waipahu .....	20	20
Wyllie Street .....	50	50
Kalihi Valley .....	50	50
Hawaii:		
Kohala .....	10	10
Maui:		
Paia .....	50	50

Respectfully submitted.

D. T. FULLAWAY,  
Entomologist.

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## Division of Plant Inspection

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Honolulu, Hawaii, November 30, 1919.

Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.

\*Gentlemen:—I respectfully submit my report of the work carried on by the Division of Plant Inspection for the month of November, 1919, as follows:

During the month 43 vessels arrived at the port of Honolulu, 21 of which carried vegetable matter and 3 vessels came through the Panama Canal Zone. The following disposition was made of the various shipments:

Passed as free from pests .....	956 lots	32,525 pkgs.
Burned .....	85 lots	85 pkgs.
Fumigated .....	7 lots	7 pkgs.
Returned .....	1 lot	1 pkg.

Total inspected..... 1049 lots 32,618 pkgs.

Of these shipments, 32,301 packages arrived as freight, 138 packages as mail and 179 packages as baggage.

#### RICE AND BEAN SHIPMENTS.

During the month 14,991 bags of rice from Japan, 250 mats of rice from China, and 1576 bags of beans from Japan arrived and were found free from pests.

#### PESTS INTERCEPTED.

Approximately 3752 pieces of baggage belonging to immigrants from foreign countries were examined, from which 41 lots of fruit and 41 lots of vegetables were seized and destroyed. One lot of fruit was sent back on board.

On November 8 a package of chestnuts and a case of plants from the mainland found in the mail per "Nippon Maru," were fumigated.

On November 15 two packages of seeds from India imported by Dr. H. L. Lyon for scientific purposes under permit No. 1989, were passed.

On November 17 three baskets of narcissus bulbs, brought by a passenger from China under government permit No. 2124, were fumigated. Also a package containing rice seeds found in the mail from Manila was burned, it being contraband.

On November 18, per "Niagara," one package of dried insects for the H. S. P. A. arrived and was passed.

On November 25, by the "Colombia," a package of rice seeds found in the mail from Manila was seized and destroyed, being prohibited, and a package of castor beans from India for the U. S. experiment station was fumigated as a precaution. One lot of barley and oats found in the baggage of an immigrant from Manila was seized and destroyed, being prohibited under Quarantine Notice No. 39.

During the month some indications of codling moth in apples and indications of potato scab on a few shipments of potatoes were noted, and immediately notice was sent to all commission merchants on the Coast regarding these conditions, with a warning that all future shipments found infested would be returned or destroyed.

#### HILO INSPECTION.

Brother M. Newell, inspector at Hilo, reports the arrival of seven steamers at Hilo. Five carried vegetable matter consisting of 233 lots and 5686 parcels, all passed as free from insect pests.

#### KAHULUI INSPECTION.

Mr. Will J. Cooper, inspector at Kahului, reports the arrival of five vessels, of which one only, the S. S. "Manoa," brought vegetable matter consisting of 1123 packages of fruits, plants and vegetables, all being found free from infestation.

#### INTER-ISLAND INSPECTION.

Fifty-four steamers plying between Honolulu and the other island ports were attended and the following shipments passed as free from pests:



Pineapple shoots .....	8200 bags
Taro .....	551 bags
Vegetables .....	354 pkgs.
Fruit .....	206 pkgs.
Plants .....	142 pkgs.
Bulbs .....	2 pkgs.
Taro tops .....	4 bags
Sugar cane .....	7 pkgs.

---

Total passed ..... 9466 pkgs.

Eighteen pots of plants were refused shipment on account of infestation, undesirable soil and not complying with the regulations.

Respectfully submitted,

E. M. EHRHORN,  
Chief Plant Inspector.

---

## Division of Animal Industry

Honolulu, Hawaii, December 19, 1919.

Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—I beg to herewith submit my report on the work of the Division of Animal Industry for the month of November, 1919:

### TUBERCULOSIS ERADICATION.

The attention of the Board has in previous reports been called to the action of the federal Congress, approved July 24, 1919, appropriating one million dollars for the compensation of owners of tuberculous cattle slaughtered for the purpose of eradicating the disease. This appropriation, which forms part of the regular annual appropriation for the federal Department of Agriculture, was originally so worded as to exclude Hawaii from benefiting by it, "territory" having been left out of the specification of localities where the money could be expended, such as "states, counties or municipalities." This omission, however, was corrected through the efforts of the chief of the federal Bureau of Animal Industry, and all arrangements were made for the partial indemnification to be assumed by said federal department when another obstacle has imposed itself and now threatens to prevent the cooperation aimed at.

The opinion has been advanced, and has tentatively received the support of the attorney general, that the federal compensation, which is limited to \$25 for a grade and \$50 for a purebred animal, is supplementary, in the meaning of *additional*, to the indemnification paid by the Territory.

The Territory, in accordance with Act 204, Session Laws of 1919, must appraise condemned tuberculous cattle at their market value, regardless of their being diseased, and must reimburse the owner with eighty per cent of the appraised value in all cases where the disease is not sufficiently advanced to prevent the use of the carcass for food, and with fifty per cent when it is necessary to condemn the carcass.

The amounts allowed by Act 204 are \$250 for a grade and \$350 for a purebred animal, when found upon post-mortem examination to be affected with tuberculosis. These amounts are liberal when it is considered that the owner gets rid of diseased cattle which are likely to spread the infection in his herd, and the writer has adhered to the

opinion that the proffered federal indemnity could not mean an additional premium to be paid to the owner, but was to be regarded more as an encouragement to those state legislatures which had not yet provided laws and indemnification funds for the suppression of tuberculosis. In the meantime, forms, vouchers and blanks forwarded by the federal Bureau of Animal Industry provide only for the indemnification of the owner directly by the said Bureau, while our law (Act 204, Session Laws, 1919) leaves no option except appraisal and reimbursement at present day market value, a contingency which, in an opinion rendered by the attorney general under date of October 8, "might result in the owner of the destroyed cattle being paid more than the full market value thereof."

The question has therefore been submitted to the chief of the federal Bureau of Animal Industry, pending whose decision the approval of local claims for reimbursement must remain in abeyance.

The testing of the herd of beef cattle at Wailupe resulted in the condemnation of 52 head out of 227. All of the reactors have been slaughtered and all were found upon post-mortem examination to be affected with tuberculosis, seven to such an extent as to require condemnation of the carcasses as unfit for food.

There still remain in the neighborhood of 50 animals untested and, as a number of these undoubtedly are affected, no time should be lost in catching and confining them in such a way that they can be handled. The complaint of the neighbors, to the effect that there is liability of transmission of tuberculosis infection from these animals to their dairy herds, is not without reason. That the cattle are wild and parts of the pasture overgrown with thorny brush, in places nearly impenetrable, cannot be allowed as an excuse for continuing a center of infection which possibly may have been contributory to the persistence of the disease in that neighborhood. The animals which cannot be rounded up, roped or trapped, should be shot, and if the land is to be continued as a cattle ranch, subdivisions, pens and chutes that will allow of the proper handling of the cattle as domestic animals should be provided. The eradication of tuberculosis from a herd which on the first test has shown twenty-three per cent of infection cannot be accomplished in short order, unless extermination of the herd is decided upon, and that would undoubtedly prove the most economic measure in the long run. With beef prices where they are now and with the strong demand for light cattle persisting, it would seem to the writer that no more favorable time could be found for ridding a valuable property of a menace which can only detract from its usefulness and discourage development.

#### FORAGE POISONING ON OAHU.

An outbreak of forage poisoning was reported from one of the large pineapple plantations on the windward side of this island. Four mules had died within two days. Hemorrhagic septicemia was suspected, but careful post-mortems of two but recently dead animals failed to show any symptoms except those of acute indigestion with overloading and paralysis of the stomach as the direct cause of death. Recent rains had caused the appearance of an abundance of succulent feed, which, in connection with the ripening of numerous pineapples, proved too much of a temptation and the animals simply gorged themselves to death.

After removal of the remaining animals to less abundant pastures, no further death was reported.

Respectfully submitted,

VICTOR A. NØRGAARD,  
Territorial Veterinarian.

## REPORT OF ASSISTANT VETERINARIAN.

Honolulu, Hawaii, November 30, 1919.

Dr. Victor A. Norgaard, Chief, Division of Animal Industry,  
Board of Agriculture and Forestry, Honolulu, T. H.

Sir:—I beg to submit the following report for the month of November, 1919:

## TUBERCULOSIS CONTROL.

The following cattle were submitted to the tuberculosis test:

	Tested.	Passed.	Con- demned.
Kamehameha Schools .....	49	49	0
Joe Caspino .....	10	10	0
Antone Costa .....	1	1	0
Antone Pires .....	12	12	0
Antone, Joe .....	13	12	1
Kalihi Farm .....	31	31	0
J. B. Coelho .....	9	9	0
M. C. Souza .....	12	12	0
Fred Luning .....	22	21	1
M. Nakamura .....	41	39	2
R. Hind .....	8	8	0
C. M. Cooke .....	6	6	0
C. M. Cooke .....	1	0	1
Antonio Perry .....	227	175	52
C. H. Bellina .....	1	1	0
Waialae Ranch .....	316	292	24

The above tabulated list shows a total of 759 head of cattle tested during the past month; 678 were passed as free from tuberculosis and 81 were condemned and branded. Of the 81 condemned cattle, 5 have been slaughtered and 77 are segregated awaiting slaughter.

## IMPORTATIONS OF LIVE STOCK.

A total of 31 vessels were boarded by the livestock inspector during the month and the following found to carry livestock for this Territory:

S. S. "Manoa," San Francisco—42 cts. poultry, various; 1 goat, Maui Dry Goods & Grocery Co.

S. S. "Maui," San Francisco—1 Shetland pony.

S. S. "Nanking," Orient—1 ct. chickens, Chuck Hoy.

Respectfully submitted,

LEONARD N. CASE,  
Assistant Territorial Veterinarian.



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# THE HAWAIIAN FORESTER AND AGRICULTURIST

FEBRUARY, 1920

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C. S. JUDD,  
Superintendent of Forestry.

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# THE HAWAIIAN FORESTER AND AGRICULTURIST

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HONOLULU, FEBRUARY, 1920.

No. 2

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The Government Nursery sent out during December, 1919, a total of 103,036 tree seedlings for use in extensive planting operations on Oahu.

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Out of a total of 143 head of dairy cattle tested during December, 1919, only three were found to be afflicted with tuberculosis and were condemned.

---

The Entomologist reared and distributed during December, 1919, a total of 12,660 beneficial insects to control local pests.

---

Of the 25,312 packages of vegetable matter arriving in Honolulu during December, 1919, the Division of Plant Inspection inspected and passed 25,200 packages and either burned, fumigated, or returned 112 packages which were not free from pests.

---

The Japanese cedar is probably the most suitable tree to raise in these Islands for Christmas trees. Its stiff branches will support the customary decorations, it will keep green for a long time, and can be raised for this purpose in two years after planting out.

---

Evidence of the dry conditions which have, until recently, obtained in parts of our forests is shown by the occurrence of a fire in the staghorn fern on November 29, 1919, in Wainiha Valley on Kauai, a place which is not many miles from what is supposed to be the rainiest spot in the world.

---

An experiment in the growing of timber trees, closely spaced, has been started recently on a few acres at Waiahole, Oahu. The trees selected are the kauri pine, which is the monarch of the New Zealand forests, where it reaches a diameter of 24 feet and produces a straight-grained, strong timber, free from knots and of remarkable durability; the Norfolk Island pine, which, in its native habitat, attains a diameter of 10 feet and produces a timber useful for ship-building and many other purposes; and the Japanese cedar, which produces a wood valued for many uses.

# The Koa Tree

By C. S. JUDD, *Superintendent of Forestry.*

Probably the best known and most popular, for a variety of uses, of all the native Hawaiian trees is the koa, *Acacia Koa* Gray. It is the largest sized tree in the Hawaiian forest, is very widespread, and next to the ohia lehua is the most common. The koa is found on all the larger islands of the Hawaiian group and adapts itself to a great variety of conditions, although it prefers and grows best on a well drained soil.

## GENUS.

The koa belongs to the genus *Acacia*, which boasts of approximately 500 species, which are distributed over the tropical and sub-tropical regions of both worlds, being especially numerous in Africa and Australia. In these islands the genus is represented by three species, one of which has two varieties:

*Acacia Koa*, the common species, which is familiar to all.

*Acacia Koa lanaiensis*, a smaller tree with shorter, almost straight leaves, found only on the island of Lanai.

*Acacia Koa hawaiiensis*, a tall tree, with very broad leaves which are almost straight, and found only on the island of Hawaii.

*Acacia Kauaiensis*, a large tree, with sickle-shaped, narrow leaves, flowers in panicles or pyramidal loosely-branched clusters, and found only on western Kauai.

*Acacia Koaia*, a smaller tree, with very hard wood and gnarled and twisted branches, pods narrower and somewhat curved, leaves stiff and narrow, and found at the lower elevations on the dry portions only of Molokai, Maui, and Hawaii.

## ORIGIN.

How the koa first came to the Hawaiian Islands is a much mooted question. Its hard, horny seeds do not float in water and are therefore not adapted to dispersal by ocean currents. It does not seem probable that the koa was introduced by human agency, because of the very long time that the tree has been here. This is evidenced by the endemic fauna of birds and insects which are quite restricted to or dependent on the koa for their existence and which prove that the host tree is a very ancient denizen of these islands. The seed of the koa may have been first brought here by birds, and it is not unlikely that the tree found its way to this region by terrestrial immigration over a continent which at one time may have connected this group with Australasia and Indo-Malaysia, but which has since sub-



YOUNG KOA TREE.

Showing true, compound leaves. Attained a height at Kolekole Pass, Oahu, of  $5\frac{1}{2}$  ft. during a very dry season 13 months after planting.





sided. It is an interesting fact, however, that the almost exact counterpart of our koa is found in *Acacia heterophylla* of Mauritius, thousands of miles away from Hawaii in the Indian Ocean, and that the blackwood tree, *Acacia melanoxylon* of Australia, which closely resembles our koa, exhibits habits of growth and characteristics which are strikingly like our own species.

#### COMMON NAME.

The Hawaiian name given to this tree has a variety of meanings, some of which seem well suited to it. The word *koa* means "soldier" and "bold" and "valiant," each of which might be applied to the upright, martial bearing of the tree. It also means "a barren, fruitless plant or tree," which might well be applied to the koa, which yields no edible fruit. The adjective also means "irregular in habit," which particularly suits the koa, for besides growing straight and tall in moist situations where good soil abounds, it also assumes a very sprawling habit with twisted branches on situations where tree growth is not so favorable.

#### DESCRIPTION OF THE TREE.

The koa is one of the most stately of the Hawaiian forest trees and is found in a variety of situations, from a few hundred feet above sea level to 7,000 feet on the higher mountains. It grows best on a well-drained soil and prefers a moderate amount of moisture. When grown in the open the koa develops a symmetrical crown with usually a short, thick trunk, branching out very often only a few feet above the ground. In such situations the lower branches will frequently sprawl over the ground for long distances. A maximum diameter of 10 feet at the ground has been observed for the trees which have only a short trunk.

When grown closely in the wet forest on deep, rich soil, the koa will attain a height of 100 feet with a clean, straight bole without a branch for 40 feet above the ground, and it was such trees that were utilized for canoes.

The tree has a shallow rooted system, a flat plane of roots spreading out in all directions just beneath the surface of the ground. For this reason the larger top-heavy trees are easily overturned by severe wind storms or when the trees are unusually exposed to the wind by abrupt openings in the forest.

The koa will thrive in comparatively dry regions, but in such places it assumes a rather stunted and misshapen form. It usually has growing beneath its shade the fern ground cover which characterizes the ohia lehua, though, as it grows generally in somewhat drier situations, its undergrowth is usually not so luxurious. The ie-ie vine especially is not often seen in a koa forest. The koa is often found on ancient a-a lava flows

to the exclusion of everything else, and in such situations it is the finally established native vegetation following the ohia lehua forest and is considered to be the ultimate forest type.

#### FOLIAGE.

The koa appears still to be in a process of evolution, for it has two kinds of leaves. The true leaf of the koa, which appears first upon the germination of the seed, is a compound bipinnate leaf. These are soon replaced as the tree grows, and the foliage matures into phyllodes which are the leaf stalks dilated into flattened stems and which in themselves become leaves and perform the usual functions of leaves. Although these are not true leaves, they are referred to as such in the first part of this article.

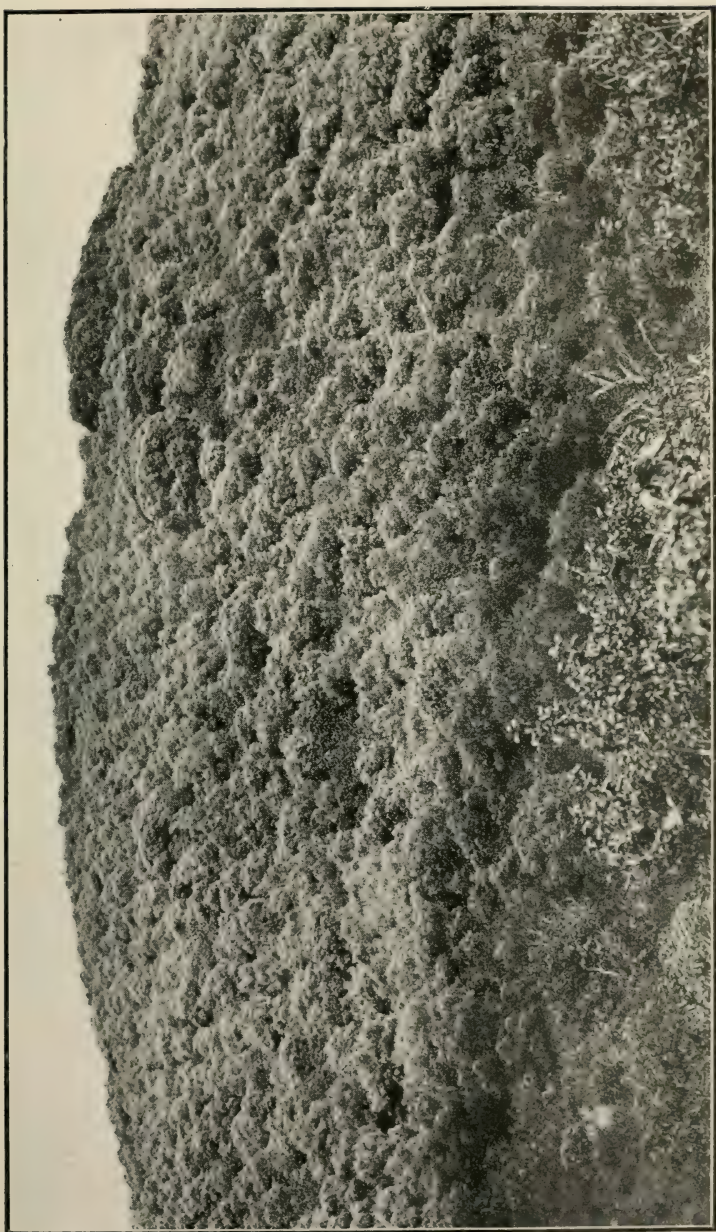
The true, compound leaf is found on young seedlings and on larger trees near the ground, where there is shade and moisture. They also are found springing from adventitious buds near the base of the trunk. As the foliage becomes more exposed to the light and heat these true, tender, compound leaves take on the new form of sickle-shaped phyllodes, which are coarser and more heat-resisting. Xerophytic conditions are responsible for the cause of the change from true leaves to phyllodes, a characteristic which was probably not evolved in Hawaii, but inherited from its ancestor on Australian soil. The Hawaii variety of koa develops very broad phyllodes at the higher altitudes, where there is more moisture in the form of fog and mist.

#### SEEDS.

The blossom of the koa consists of a small, densely globose, flowered head of a yellowish color, which develops into flat pods or legumes up to six inches long, brown in color, and which usually open on the tree. In each pod there are up to 12 seeds, which are flat, hard and shiny, and dark brown to black in color. The seed of the koa on Oahu is brown, about the size of and resembles an apple seed. The Hawaii variety of koa has a seed twice the size and is darker, while the seed of *Acacia Kauaiensis* is almost round, flat, and black. The horny seed often remains on the tree for a year after it ripens, and when lying dormant in the ground it is known to have retained, for a period of 25 years, its ability to germinate. To hasten sprouting when planting the seed, it is necessary first to soak it for 24 hours in very hot water.

#### INSECT ENEMIES.

As the seed pods mature they are attacked by the larvae of four different species of Tortricid moths, which feed on the young growing seeds, working from one to another until often



PLANTED KOA FOREST.

On the Honolulu Watershed Forest Reserve, 3 years old.





every seed in a pod is destroyed. Owing probably to forest depletion and the consequent upsetting of the balance of nature, the native hymenopterous parasites which attack the larvae of these moths are not so efficient in keeping them in check, with the consequence that almost every new crop of koa seed is now badly infested.

A spanworm also in places denudes the koa trees of their phyllodes or leaves, working in large numbers for a few weeks. Here again the damage is due to disturbed forest conditions, because under normal conditions which formerly existed the dense undergrowth, since removed, presented favorable moist conditions for the fungus which destroyed the spanworm larvae when they came down to the ground to pupate.

#### NATURAL REPRODUCTION.

The common method that the koa has of reproducing itself is by seed, but in order to germinate and grow it requires the full, warm sunlight, and will not successfully sprout in the shade. Young seedlings spring up remarkably well after a fire has passed over the ground. The seed that escapes incineration seems to be prepared for germination by the warmth of the fire, and many a burned-over area has been reclothed with a new forest in this manner from seed that has lain dormant in the soil. Young seedlings in large numbers are often found coming up from seed in a fringe or circle around the mother tree, representing the group method of natural reproduction. The koa will also reproduce in a less satisfactory manner by suckers coming up from the roots of old trees.

#### WOOD.

The wood of the koa is probably the most valuable, commercially, of all Hawaiian trees and is the best known. The koa does not exist in large enough tracts to make extensive logging operations profitable. It was formerly put on the market as "Hawaiian mahogany." Owing also to its comparative inaccessibility and high freight rates, it is now cut only in small quantities, sufficient to supply the local demand for furniture, cabinet work and musical instruments. The sapwood of the koa is white. The heartwood, which seasons well without splitting, is moderately heavy and hard, and varies in color through many rich shades of dark red to a golden brown. The grain is fine and indistinct, and is capable of receiving a high polish. The curly grain, which is often found in the wood of trees growing in the drier localities, gives the curious fiddle-back appearance and is highly prized. The wood has been used for the interior finish of houses with rich effects. The bark of the koa has valuable tannic properties.

## CANOE WOOD.

The ancient Hawaiians used koa wood for canoes, house timbers, surf boards, paddles, and spears. It was used more for canoes than for house timbers, the thatched houses being generally framed with naio, uhiuhi, kauila, mamani, and kamani. The longest surfboards, up to 16 feet in length, were made of the koa, but the tree was preeminently prized in the early days because it furnished the largest and most suitable wood for their canoes, which were hollowed out of a single log. The wood of the breadfruit, kukui, ohia-ha, and wiliwili was also used for canoes, but in limited quantities. Ellis records having seen one koa canoe "upwards of sixty feet long and between two and three feet deep," but as a rule they seldom exceeded fifty feet in length.

The building of a canoe was an affair of religion. A sound koa tree suitable for a canoe was decided upon by the aid of a kahuna's visions. The canoe builder also trusted to Lea, a patroness of the canoe, who was supposed to appear in the form of the friendly elepaio, who indicated a proper tree, neither worm-eaten nor decayed, and whose movements when she walked upon the newly-felled tree were attentively observed, and were ominous of good, or ill, luck. After the koa tree was felled by the use of stone adzes, it was rudely shaped and then hauled by means of strong ropes, made of hau bark, to the ocean, where the body was finished, the additional trimmings lashed on, and the steadying outrigger adjusted. The latter consisted of the iako, two arched hau sticks, which held the ama, or parallel float, made usually of wiliwili wood. Often two canoes were rigged together and made the very seaworthy double canoe, or kau-lua. The canoe, with its furniture, was considered a valuable possession, of service both to the people and to the chiefs, and if it had not been for the fine large koa trees which supplied the main body for the canoe, the early natives would have been without proper means of ocean travel and would have been handicapped in their fishing operations and their wonderful trading voyages to other lands.

Very few koa canoes are made today, and the large trees suitable for their construction have almost entirely disappeared.

## PRESENT VALUE.

The chief present value of the koa tree today is not as a lumber producer, but is in the form of a forest which acts as a beneficial cover on our mountain slopes to prevent erosion and to hold the rainfall. The extensive koa forests of the early days have been greatly reduced by the ravages of man, cattle, and fire, and good stands are now found only in the more inaccessible regions where they have received protection. Elsewhere the koa occurs in open groves and as surviving individuals.





TRUNKS OF LARGE KOA TREES ON HAWAII.





## USE IN REFORESTATION.

The koa is a suitable tree to use in reforesting denuded areas where good drainage and favorable soil and moisture conditions obtain. The seedlings are easy to handle in the nursery, and young trees reach in two months a height of from 6 to 8 inches and are then ready for planting out. The koa has a comparatively rapid growth during its earlier years. In favorable localities it will attain a height of 30 feet in five years and, if planted 15 by 15 feet apart, will during the same time form a complete crown canopy over the ground.

## New Pests on the Mainland

BY E. M. EHRHORN, *Chief Plant Inspector.*

### THE JAPANESE BEETLE OF THE EASTERN STATES.

During the last few months newspapers have published articles about the appearance of the Japanese beetle in New Jersey. From letters and specimens received from New Jersey, the pest is not the common Japanese rose beetle that we have in these Islands, but is closely related to the *Anomala* beetle and feeds on many plants during the daytime. This pest (*Popilia japonica*), it is claimed, was introduced some seven or eight years ago in soil with imported iris roots from Japan. From all accounts this beetle does considerable damage to grapes, peach, plum, apples, cherry and many ornamental shrubs, weeds and various truck crops, especially sweet potatoes and sweet corn. In the case of corn the beetle penetrates the tips of the ears, working in a similar way as does the corn ear worm, and as it remains in these ears for an indefinite time, it could be transmitted in shipments of green corn to various markets; fortunately we are too far away from the eastern states for green corn shipments.

The Federal Horticultural Board of Washington, D. C., has placed a quarantine on certain portions of New Jersey, and the Bureau of Entomology and the State of New Jersey are cooperating in trying to eradicate this pest.

### FLAG SMUT AND TAKE-ALL DISEASES.

These diseases have appeared on the mainland in the States of Illinois and Indiana.

*Flag smut* affects the leaf blades, leaf sheaths, stems and, at times, the spikes of wheat. The losses to crops from this disease run from one-tenth to one-half of the crop. The spores are

carried on the seed and live over in the soil. This disease is known to exist in Australia, East India and Japan.

*Take-all disease*, also known as whitehead or footrot, attacks the roots and the bases of grain plants, rotting the roots and blackening the base of the stem. It infests wheat, and is also known to infest oats, barley, rye and rice. The risk of introducing both the above diseases lies in the importation of any seed which could carry the spores. Therefore, under Quarantine Order No. 39, all wheat, barley, oats, rye and rice in the raw or uncleaned or unprocessed state is prohibited from entry into the United States and its Territories from India, Japan, Australia, Germany, Belgium, Great Britain, Ireland and Brazil. All persons are therefore warned not to import any of the above mentioned grains, either by freight or even in small parcels by mail, as under the regulations all such material will be seized and destroyed.

Under Quarantine Order No. 24, the Federal Horticultural Board prohibits the importation, in the raw and unmanufactured state, of seed and all other portions of Indian corn or maize (*Zea Mays*) as well as the closely related plants, including all species of *Teosinte*, Job's tears, and various others on account of the downy mildews and Physoderma diseases of Indian corn. Several small lots of corn seed have been seized and destroyed lately at the postoffice and all future importations will meet a like fate.

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## Intestinal Parasites in Poultry

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(As many inquiries are received in the office of the Territorial Veterinarian, the following extract from Dr. B. F. Kaupp's "Diseases of Poultry" may prove of benefit to all poultry raisers in the Territory.)

"Intestinal parasites in small numbers infest all fowls without doing perceptible harm, but there is always possibility that conditions for their propagation may become so favorable as to turn the mildest infestation into devastating parasitism. Indeed, this very thing has occurred numberless times, and not a few flocks have been entirely destroyed by it. The death of any bird from the effects of internal parasites should be looked upon with apprehension.

"Flocks infested with large numbers of round worms are unprofitable in the extreme. The birds are unthrifty, appear unkempt and suffer from diarrhea and constipation. Young fowls are most severely affected.

"TREATMENT. It is necessary to keep the yard and henhouse clean, lime scattered on the floor and about the yard, and the water for the birds kept in a clean fountain and the food in clean troughs, made for the purpose and disinfected daily, and so con-

structed that birds cannot step into them. If at all possible, birds should be moved upon new ground. The parasites' eggs in the droppings removed from the henhouse may be destroyed by mixing the manure with unslaked lime.

"The birds may be given one teaspoonful of turpentine followed by a tablespoonful of olive oil. If the crop is full the dose of turpentine should be double. Five to ten-grain doses of areca nut is good treatment. The areca nut can be mixed with soft feed and fed from a clean trough; it acts as a cathartic as well as a parasiticide. One-grain doses of thymol are an excellent treatment for round worms.

"ERADICATION OF WORMS. A campaign to control the round worms of all kinds infesting the intestinal tract involves both treatment of the fowls in order to expel the worms, and disinfection and sanitation of the coops and runways to prevent infestation.

"Birds do not like mash in which there is incorporated turpentine or areca nut. Tobacco stems finely chopped and steeped in hot water for two hours and mixed with mash gives uniformly good results and is readily eaten by the fowls. Experiments in this laboratory show that badly infested birds expel large numbers of worms and upon post-mortem examination are entirely freed from the infestation. Two doses should be given three days apart. For each fifty fowls one-half pound finely-chopped tobacco stems should be used. The birds should be fed this mixture in the morning, or on an empty crop. In the evening give to each fifty fowls five ounces of epsom salts dissolved in water and this water mixed with mash. Do not give any other feed for that day. For chicks give doses in proportion to the size of the birds. This treatment will cost about one cent for each ten birds.

"The treated birds should be moved to yards and houses free from infestation. In yards where infested fowls have been kept it has been found upon microscopic examination that the soil may be infested by the eggs of the round intestinal worms to a depth of two inches below the surface. For disinfecting the yards a corrosive sublimate solution 1 to 1,000 may be used. This is applied by aid of a sprinkling can after all rubbish has been swept up and removed. One gallon of the solution should be used for each ten square feet.

"The house should be thoroughly cleansed and every square inch saturated with the corrosive sublimate solution. The litter removed from the yard and house should be hauled out and scattered on a field used for raising crops and removed from the fowls.

"Mercuric chlorid (corrosive sublimate) is poisonous, and care must be taken not to allow the birds to drink it or the food or water to become contaminated with it. After the feed and water troughs have been thoroughly scrubbed inside and out with the solution, they must be rinsed with clear water."



## TEN RULES OF BEEF PRODUCTION.

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First. Plenty of pasture and feed.

Second. The right kind of cows—those that will produce good calves regularly.

Third. A good, purebred registered bull—one that will sire good calves persistently.

Fourth. A large calf crop. This means that all cows shall drop calves, and that the calves shall be properly cared for at birth.

Fifth. Proper care of the breeding herd and the calves.

Sixth. Selection of good heifer calves to replace old or inferior cows.

Seventh. Prevention of disease among the breeding herd and the younger stock.

Eighth. Shelter sufficient to protect the cattle from both severe cold and extremely hot weather.

Ninth. A practical knowledge of fattening cattle for market.

Tenth. Marketing to advantage.

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## RARE SUGAR FOUND IN HONEY.

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Although known to occur in various forms, even perhaps as one of the constituents of the manna of Scripture, melezitose is one of the rarest sugars. Minute quantities of it have been available to scientists for many years, but the supply has never been sufficient to permit of extensive experimentation. Now, by the aid of some Pennsylvania bees, many of which lost their lives, the United States Department of Agriculture has several kilograms of this rare substance, extracted and purified in the Bureau of Chemistry.

The bees in certain sections of Pennsylvania were storing up honey that crystallized, with the result that in the following winter seasons the bees were not able to digest it, and starved. The crystallized substance in the honey was found to be melezitose, which derives its name from *melez*, the French name for the larch tree, on which it was originally discovered in the form of honeydew. It also occurs in a sugary incrustation, or manna, on a leguminous tree in Persia and adjoining countries. Recently it has been found by the Bureau of Chemistry in a similar product on the Douglas fir in British Columbia. And now it has turned up in Pennsylvania, stored away in the honeycomb in numerous hives. In this instance the following origin of the substance has been worked out:

The scrub pine, and rarely other species of pine, are subject to attack by a plant louse and by a scale insect. In the course of their life activities these insects produce a honeydew which is rich in melezitose. In dry summers, after the white clover flowers have ceased to yield honey, the bees turn to this honey-



dew, and collect it; but it crystallizes as fast as they store it away. This occurred in 1917 and 1918, and considerable losses were suffered by beekeepers. In 1919 the weather was so moist during July that no melezitose was gathered by the bees at all. But it probably will be collected in future whenever the summer is dry; and the honey of central Pennsylvania may afford a permanent source of sugar previously so rare as to be only imperfectly known. The Bureau of Chemistry extracted considerable quantities from the honey of 1917 and 1918, and is making extensive experiments with it. Rare as it has always been, there is a definite demand for melezitose for use in scientific laboratories. It can be distinguished from other sugars by certain peculiarities of crystallization observable with the polarizing microscope.

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## Division of Forestry

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Honolulu, Hawaii, January 7, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—I respectfully submit the following routine report of the Division of Forestry for the month of December, 1919:

### TREE PLANTING.

A few showers at Mikilua made conditions favorable for the planting out of the following trees in the Luualualei Forest Reserve: 979 red gum, 832 ironwood, 388 logwood, and 131 bloodwood, a total of 2,330 trees. At Makiki 335 koa trees were planted out.

On December 3, 60 Kauri pine trees, free of soil and with the roots packed in damp moss, were sent by mail to Hilo for planting on the boundary of the Animal Quarantine Station. These plants were seven days en route before being unpacked and were found to be in good condition.

During the month the clearing and plowing of two and one-half acres of land in the Waiahole Forest Reserve, preliminary to tree planting, was completed. On this area Kauri pine, Norfolk Island pine and Japanese cedar trees will soon be planted out under close spacing conditions in order to determine their lumber producing abilities.

According to custom, reply postcards were sent out at the end of the month to all tree planters throughout the Territory in order to obtain for the year 1919 a record of the different kinds of trees planted and the purpose of plantings.

For the celebration of Christmas, the Division of Forestry was able to furnish quite a number of Japanese cedar trees from the plantation in Makiki which was established two years ago for this special purpose.

Permission was obtained on December 5 from the Superintendent of Public Works to use non-citizen labor at the Haiku Nursery. Ranger Lindsay had had a native born Chinese laborer working at the nursery for about one month, and after he had left for higher wages, he found it impossible to secure any other labor than Japanese. After securing this permission, Ranger Lindsay transferred to our payroll the Japanese laborer who has been working for him for a great number of years and is competent to take care of the trees at the new nursery.

## FOREST PROTECTION.

On December 3, with the assistance of a government surveyor, the boundary line of certain private property on Tantalus was relocated, and it was found that the Japanese keeper had encroached on government land. He was at once instructed to move his fence back to the proper boundary, and to keep his stock at home, and plans have been made to reforest with native species of trees the area in the region on which Hilo grass has made encroachments. At the same time seed of the native papala kepa, kalia and ahakea trees was secured for planting on the area in addition to koa trees, which will be planted in greater number.

During the month suitable clauses requiring certain fencing along the forest reserve boundary and the prevention of the inroads of stock were submitted to the Land Commissioner for inclusion in the new general leases of government lands of Waimea and Mokihana, Kauai.

On December 10, Entomologist Fullaway and I made a trip to Palolo crater to investigate certain field conditions. We were unable to find any trace of infestation of the Sadleria ferns by the Australian fern weevil. The native forest immediately south of the crater was found to be somewhat deteriorated, probably due to soil conditions followed up by the invasion of Hilo grass. Ten pounds of karaka tree seed were sowed in seed spots in open areas in order to form the nucleus for a new forest in this region which should eventually shade out the Hilo grass. The survey office has also been requested to furnish a map and description of the area in the higher mountain region back of Honolulu on which it is proposed to prohibit human trespass in order to give the native forest the fullest protection possible.

Plans have been made to repair certain existing fences and to build a stretch of new fence on the boundary of the Kulioouou Reserve in order to give the remaining native forest full protection from the inroads of stock from neighboring ranches.

District Fire Warden A. Menefoglio reports that on November 29 a fire started along the ditch trail in Wainiha Valley, Kauai, and although it burned a considerable area of staghorn fern, no great damage was done to the forest.

During the month an inspection was also made of the forest reserve lands in Aiea, Oahu, where the forest was found to be in good condition, although rather dry. Observations were made for infestation of ferns by the Australian fern weevil, but no trace of the weevil could be found and the Sadleria ferns in this region are in a very healthy condition.

Respectfully submitted,

C. S. JUDD,  
Superintendent of Forestry.

## REPORT OF FOREST NURSERYMAN.

Superintendent of Forestry, Honolulu, T. H.

Sir:—I herewith submit a report of the work done during the month of December, 1919:

## NURSERY.

Distribution of plants:

Sold .....	21 plants
Gratis .....	1,015 "
Total .....	<u>1,036 plants</u>

## COLLECTIONS.

## Government Realizations:

Plants Sold .....	\$ 22.90
Rent of Office Building, Nursery Grounds, for November.....	35.00
Refund on payment of wages of Chong Kui, Haiku, Maui....	3.23
Refund on return of anthrax serum by H. K. Mulford & Co., Philadelphia .....	123.33
Total .....	<u>\$184.46</u>

## Preservation of Forest Reserves:

78 loads of black sand from Makiki Valley sand pit..... \$ 39.00

## Camp Site Fees:

Camp Site No. 34, Kokee Camps, Kauai, Jan. 1 to Dec.  
31, 1920 ..... 8.00

## Rents and Fees:

Minota, rent of premises at Half Way House, Tantalus..... 30.00  
Fee for land and gathering ti leaves, Kalawahini, Pauoa Val-  
ley, quarter ending December 31, 1919..... 12.50

\$ 89.50

## PLANTATION COMPANIES AND OTHER CORPORATIONS.

Under this heading the distribution of plants amounted to 101,000 seedlings and 1,000 pot grown. We have about 100,000 more ordered and those we expect to have ready about the beginning of February.

## MAKIKI STATION.

The work at this station has been principally routine. A good supply of trees are on hand and we are adding to our stock.

## HONOLULU WATERSHED.

During the month 335 koa trees were planted in Opu Valley. Other work consisted of clearing off and making holes.

## ADVICE AND ASSISTANCE.

The writer has made a number of visits to Fort Ruger and also to Fort De Russy for the purpose of giving advice in planting, etc.

Other visits made at the request of people in and around the city were as follows: Visits made, 9; advice by telephone, 8; advice to people calling, 9.

Respectfully submitted,

DAVID HAUGHS,  
Forest Nurseryman.

# Division of Entomology

Honolulu, Hawaii, January 3, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—During the month of December the insectary handled 14,900 pupae of the melon fly, from which there were bred 1,724 females and 1,301 males, *Opius fletcheri*.

The distribution of parasites was as follows:

## MELON FLY PARASITE.

### *Opius fletcheri*

Oahu:	Females.	Males.
Wahiawa .....	1,210	1,080

## FRUIT FLY PARASITES.

### *Diachasma fullawayi*.

Oahu:		
Kalihi .....	150	130
Wyllie Street .....	10	10
Nuuanu Avenue .....	70	40

### *Galesus silvestri*.

Oahu:	
Nuuanu Avenue .....	600

### *Diachasma tryoni*.

Oahu:		
Kalihi .....	800	650
Wyllie Street .....	200	200
Nuuanu Avenue.....	150	150

### *Tetrastichus giffardianus*.

Oahu:		
Kalihi .....	2,500	
Nuuanu Avenue .....	800	
Wyllie Street .....	1,000	

### *Opius humilis*.

Oahu:		
Kalihi .....	300	250

### *Dirhinus giffardi*.

Oahu:	
Nuuanu Avenue .....	360

## CORN LEAF HOPPER PARASITE.

### *Paranagrus osborni*.

Oahu:		
Makiki Nursery .....	1,800	
Kaimuki .....	200	

Respectfully submitted,

D. T. FULLAWAY,  
Entomologist.



## Division of Plant Inspection

Honolulu, Hawaii, December 31, 1919.

Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—I respectfully submit my report of the work carried on by the Division of Plant Inspection for the month of December, 1919, as follows:

During the month 67 vessels arrived at the port of Honolulu, 26 of which carried vegetable matter, and 9 vessels came through the Panama Canal. The following disposal was made of the various shipments:

Passed as free from pests .....	1,209 lots	25,200 pkgs.
Burned .....	102 “	102 “
Fumigated .....	6 “	6 “
Returned .....	4 “	4 “
<hr/>		
Total Inspected .....	1,321 lots	25,312 pkgs.
<hr/>		

Of these shipments 25,011 packages arrived as freight, 141 packages as mail and 160 packages as baggage.

### RICE AND BEAN SHIPMENTS.

During the month 1,003 bags of rice from Japan, 260 mats of rice from China and 2,374 bags of beans from Japan arrived and were found free from pests.

### PESTS INTERCEPTED.

Approximately 5,860 pieces of baggage belonging to immigrants from foreign countries were examined, from which 55 lots of fruit and 30 lots of vegetables were seized and destroyed.

On December 2 a package of rice seeds found in the mail from Japan was seized and destroyed, being prohibited.

On December 6, per Persia Maru, 3 plants were found in the baggage of an immigrant from Japan. These were seized and destroyed.

On December 10 a package of corn found in the mail from Japan was seized and destroyed. A package of chestnuts was fumigated as a precaution.

On December 21, per Nippon Maru, a package of chestnuts found in the baggage of an immigrant from Japan was seized and destroyed on account of being infested with weevils. Four plants belonging to a passenger were returned on board the steamer. Two packages of rice seeds and a package of iris roots were found in the mail from Japan and these were destroyed, being prohibited under Quarantine Order No. 37 of the Federal Horticultural Board.

On December 22, per Korea Maru, 2 packages of pili nuts found in the baggage of immigrants from Manila were seized and destroyed.

On the same date, per Venezuela, a package of pili nuts found in the baggage of a passenger from Manila was seized and destroyed. A package of wistaria seeds, a package of bulbs, a small bag of barley and a package of herbs, all in the mail from Japan, were seized and destroyed, being prohibited. Two packages of seeds from India for the Board of Agriculture were fumigated and passed; a package of vegetable seeds, a package of chestnuts and a package of taro for food from Japan were fumigated and passed.

On December 23, a box of orchids brought in the baggage of a passenger

from Sydney, N. S. W., was seized and destroyed under Quarantine Order No. 37 of the Federal Horticultural Board.

#### HILO INSPECTION.

Brother M. Newell, Inspector at Hilo, reports the arrival of seven steamers at the port of Hilo. Three carried vegetable matter, consisting of 69 lots and 3226 parcels, all passed.

#### KAHULUI INSPECTION.

Mr. Will J. Cooper, Inspector at Kahului, reports the arrival of eight vessels at the port of Kahului. One carried vegetable matter, consisting of 10 lots and 1004 parcels. These were all passed excepting one plant in soil. This was returned on board.

#### INTER-ISLAND INSPECTION.

Sixty steamers plying between Honolulu and the other Island ports were attended and the following shipments passed as free from pests:

Taro .....	709 bags
Fruit .....	235 packages
Vegetables .....	549 "
Plants .....	138 "
Seeds .....	21 "
Pineapple shoots .....	5430 bags
Sugar cane .....	21 packages
Total passed .....	7103 packages

Sixteen pots of plants and one package of sugar cane were refused shipment on account of infestation, undesirable soil and not complying with the regulations.

Respectfully submitted,

E. M. EHRHORN,  
Chief Plant Inspector.

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## Division of Animal Industry

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Honolulu, Hawaii, January 13, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—I beg to submit herewith my report on the work of the Division of Animal Industry for the month of December, 1919.

#### IMPORTATIONS OF LIVE STOCK.

On December 4th the S. S. Lurline arrived here with the following live stock on board:

3 jacks, Parker Ranch, Hawaii; 1 stallion, Brewer & Co.; 2 bulls (Durham), O. R. & L. Co.; 1 bull (Jersey), J. H. Peterson; 18 bulls (Herefords), 2 heifers (Herefords), Dr. Raymond; 12 cows (Holstein), Chas. Lucas; 1 bull (Holstein), College of Hawaii; 5 cows (Ayrshire), Harold Rice; 16 mules, Schuman Carriage Co.; 1 dog (collie), M. Nicol; 15 coops chickens, S. I. Shaw and others.

Of all these consignments of live stock, only one (the 18 bulls and 2 heifers for Dr. Raymond) was accompanied by the requisite health certificates. The attention of the agents of the Matson Navigation Company was called to this fact, and they were reminded that during the year 1919 hardly any shipment of live stock arrived by the Matson boats at either Hilo or Honolulu accompanied by the proper papers. In spite of this, an attempt was made to bring a dog ashore from the S. S. Maui, which arrived here on the 19th of December. This dog was being carried ashore in a covered basket by a room steward, and, even though the purser had furnished the inspecting officer with a list of the live stock on board, this dog did not appear on the list. The dog was apprehended by our Live Stock Inspector and was taken to the quarantine station.

In order to straighten out this lack of co-operation on the part of the Matson Navigation Company, I have requested the local agents to furnish me transportation from Honolulu to San Francisco and return. In case this request is complied with I shall, with the Board's permission, endeavor to bring the Federal Bureau of Animal Industry inspectors in San Francisco, as well as the inspectors from the state veterinarian's office, into conference with the Matson Navigation Company with a view to evolving some system that will insure that the rules and regulations of this Board be complied with in the future.

### INFECTIOUS DISEASES OF LIVE STOCK.

Two outbreaks of hemorrhagic septicemia in hogs have been reported from Maui. Both outbreaks were brought under control by means of the swine plague bacterins and the necrobacillosis powder which were provided through the animal industry revolving fund.

An outbreak of cerebro-spinal meningitis was reported from the Island of Molokai. Seven mules and one horse died. This disease, the nature of which is unknown, has recently caused considerable losses on both Hawaii and Maui, and, unfortunately, we are unable to provide any treatment beyond a change of feed and, if possible, removal from the infected pastures to higher grounds.

### TUBERCULOSIS CONTROL.

From the appended report of the Assistant Territorial Veterinarian, it will be seen that during the past month 143 head of cattle were tested, out of which number 3 were condemned.

The recommendation of Dr. Case in regard to the manner of dealing with the Wailupe herd is approved. The complete extermination of this herd would undoubtedly prove the most economical way of dealing with it and thereby put a stop to the spread of infection to neighboring herds.

On December 11, the following wireless message was sent to the Chief of the Federal Bureau of Animal Industry at Washington, D. C.:

"Is Federal indemnification to form part of total territorial indemnification or additional thereto. If part can Territorial pay full amount to owner and collect difference from you upon vouchers made out favor Territorial Board of Agriculture and Forestry? Cable reply.

"NORGAARD."

Up to this date no reply has been received. The opinion of the Attorney General, to the effect that the Federal indemnification for cattle condemned on account of tuberculosis should be in addition to the indemnification paid by the Territory and should not form part of the Territorial indemnification, is herewith appended.

Respectfully submitted,

VICTOR A. NORGAARD,  
Territorial Veterinarian.

## REPORT OF ASSISTANT VETERINARIAN.

Honolulu, Hawaii, January 10, 1920.

Dr. Victor A. Norgaard, Chief, Division of Animal Industry,  
Bureau of Agriculture and Forestry, Honolulu.

Sir:—I have the honor to submit the following report for the month of December, 1919:

## TUBERCULOSIS CONTROL.

During the month of December the following cattle were tested:

	Tested.	Passed.	Con- demned.
Dr. J. H. Raymond .....	20	20	0
Fred Luning .....	8	8	0
C. W. Lucas .....	4	4	0
J. H. Peterson .....	1	1	0
O. R. & L. Co. ....	2	2	0
College of Hawaii .....	1	1	0
S. M. Damon .....	80	79	1
Fred Luning .....	1	1	0
S. M. Damon .....	27	25	2

The above tabulated list totals 143 head, out of which number 140 were passed and 3 condemned and branded.

Besides the above, post-mortem examinations were made at the slaughter house on 54 head of condemned cattle. Of these, 52 head came from the Wailupe Ranch, and were found to be so badly affected with tuberculosis that 7, or 13.4 per cent, had to be condemned entire as being unfit for human consumption.

It is my opinion that this ranch has formed a center of infection for many years, and it is due to the large percentage of disease there that our efforts at eradicating tuberculosis from that section of the Territory have been largely unsuccessful.

All efforts must be made to eradicate this center of infection, either by eliminating the entire herd at once, and this method is to be preferred as being less expensive to all parties concerned, or tests of the *entire* herd at three-month intervals.

## IMPORTATIONS OF LIVE STOCK.

A total of 52 vessels were boarded by the Live Stock Inspector during the past month, of which the following were found to carry live stock for this Territory:

S. S. West Cawthon, San Francisco: 2 horses, Alexander & Baldwin; 1 Berkshire boar, College of Hawaii; 14 cts. poultry.

S. S. Lurline, San Francisco: 3 jacks, Parker Ranch; 1 stallion, C. Brewer & Co.; 2 Durham bulls, O. R. & L. Co.; 1 Jersey bull, J. H. Peterson; 18 Hereford bulls, 2 Hereford heifers, Dr. J. H. Raymond; 12 Holstein cows, C. W. Lucas; 1 Holstein bull, College of Hawaii; 4 Ayrshire cows, Harold Rice; 16 mules, Schuman Carriage Co.; 1 collie, M. Nicol; 15 cts. poultry.

S. S. Sachem, San Francisco: 17 cts. poultry

S. S. Manoa, San Francisco: 54 cts. poultry.



S. S. Maui, San Francisco: 17 cts. poultry, 1 German collie, R. W. Atkinson.

S. S. Hyades, San Francisco: 17 cts. poultry.

S. S. Korea Maru, Orient: 1 Japanese spaniel, Dr. E. C. Waterhouse;  
1 Japanese spaniel, T. Sasaki.

Respectfully submitted,

LEONARD N. CASE,  
Assistant Territorial Veterinarian.

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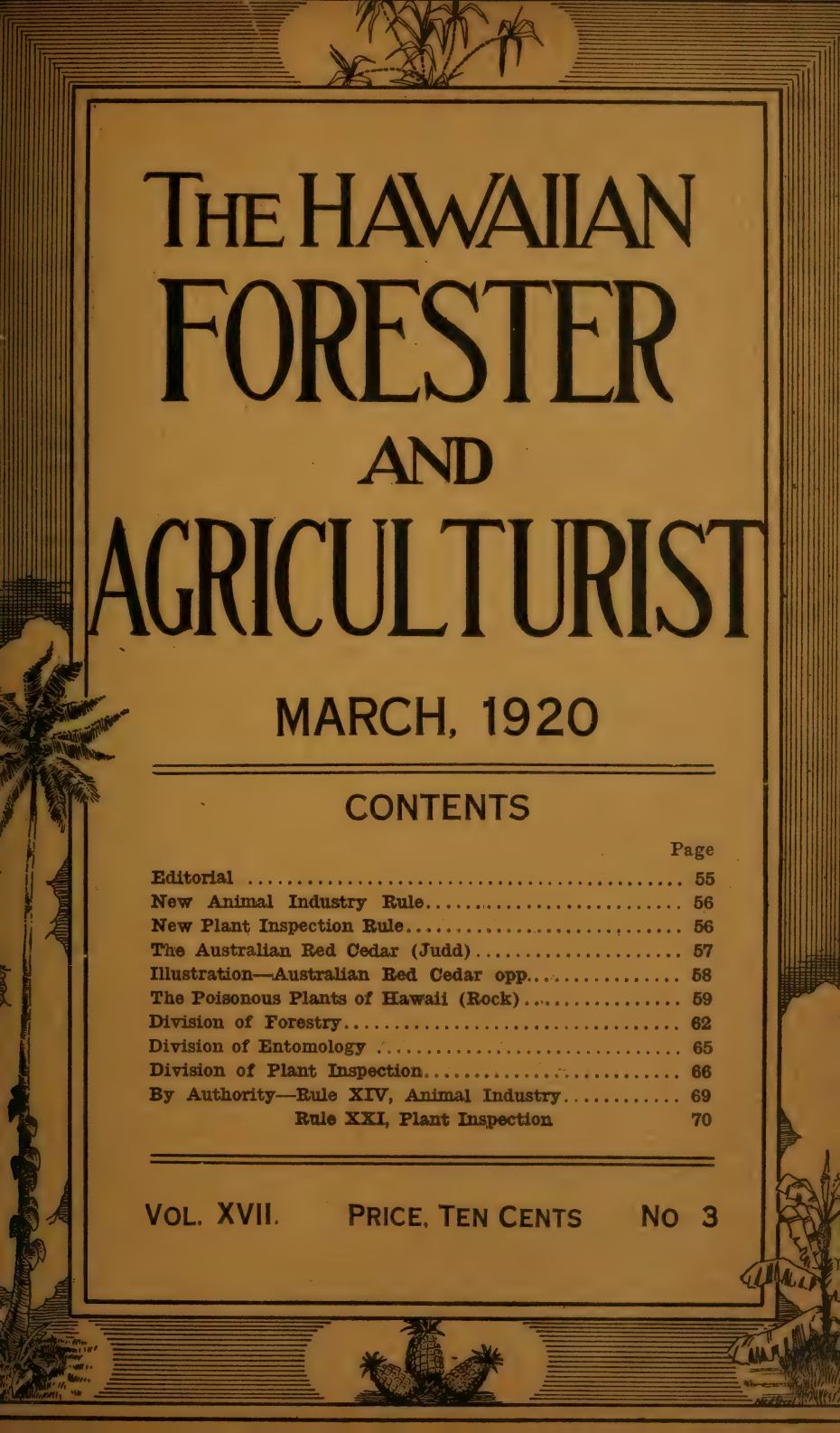
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# THE HAWAIIAN FORESTER AND AGRICULTURIST

MARCH, 1920

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C. S. JUDD,  
Superintendent of Forestry.

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# THE HAWAIIAN FORESTER AND AGRICULTURIST

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VOL. XVII.

HONOLULU, MARCH, 1920.

No. 3

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During January there were distributed from the Government Nursery in Honolulu a total of 72,324 trees of various species for planting on the Island of Oahu.

The attention of shippers of dairy cattle is called to the new rule of this Board—"Rule XIV, Division of Animal Industry"—which appears in this issue.

The prolonged dry spell has rendered the native forest growth in the mountains very inflammable and it behooves everyone traveling in the woods or over grass lands to use the greatest precaution, so as not to start any fires.

In the tuberculin test for January, only eight head of dairy cattle, out of a total of 430 head, were found to be infected with bovine tuberculosis and were condemned by the Territorial Veterinarian.

It is hoped that the controllers of the upper forest lands of Kahuku, Oahu, will take early steps toward the protection of the remaining native forest in that region, which is very important in the scheme of water conservation.

Among the trees planted out by the Division of Forestry during January, there were 490 kauri pines, the valuable timber trees from New Zealand. These were set out 10 by 10 feet apart at Waiahole in plantation formation.

The attention of those who are interested in the planting of a timber tree of real value is called to the special article in this issue on the Australian red cedar, which already shows good promise in this Territory.

Of a total of 57 vessels touching at Honolulu during January, only 20 carried vegetable matter, consisting of 12,152 packages. Of these, 121 packages were, upon inspection, found to be infested or imported contrary to regulation, and were either burned, fumigated, or returned by the Plant Inspector.

In order to prevent the further spread of certain insect and plant pests in this Territory, a new rule of this Board—"Rule XXI—Division of Plant Inspection"—was recently approved by the Acting Governor and appears on the By Authority page of this issue.

The protection of one more forest reserve on Oahu from the ravages of stock was completed during January by the repairing of old fences and the building of a stretch of new fence on the boundaries of the Kuliouou Forest Reserve at the eastern end of the island. A total fence length of 1.82 miles was thus made stock-proof.

Hawaii has no snakes and fortunately has very few poisonous plants, so that one may tramp in the hills with unhampered pleasure. There are certain plants and fruits, however, which are poisonous, and for this reason it is well for the stranger to refrain from tasting or handling the fruit or leaves of unfamiliar plants. One common mistake is for the newcomer to eat raw kukui nuts, and the eating of a few raw castor oil beans has lately resulted in a fatality. In order to help those who are unfamiliar to recognize the plants that should be avoided, there is printed in this issue a brief article by Consulting Botanist J. F. Rock on the more common poisonous plants, both native and introduced, found growing in these islands.

## New Animal Industry Rule

The Board of Commissioners of Agriculture and Forestry on February 11, 1920, adopted a new rule, known as "Rule XIV—Division of Animal Industry," which was needed to prevent the further spread of bovine tuberculosis by the inter-island shipment of untested dairy cattle.

The reasons for adopting this new rule are fully set forth in the Territorial Veterinarian's report for January. This rule received the approval of the Governor of the Territory on February 25, and is printed on the By Authority page of this issue.

## New Plant Inspection Rule

On February 11, 1920, the Board of Commissioners of Agriculture and Forestry adopted a new rule, known as "Rule XXI—Division of Plant Inspection," to prevent the further spread of certain known insect and plant pests. This new rule, which appears on the By Authority page of this issue, received the approval of the Acting Governor on February 25, and has since been published.



The necessity of such a rule was forcibly brought to the attention of the Commissioners by the recent discovery of an infestation of the Australian fern weevil in a new region on the island of Hawaii. This weevil had evidently been carried for almost 30 miles on some form of fern plant to this new region. This shows how readily undesirable insects which are destructive to forest growth may unintentionally be disseminated. The aim of this rule is to prevent the further spread of such pests.

The letter of transmission presenting this rule to the Board for adoption follows:

February 7, 1920.

*Board of Commissioners of Agriculture and Forestry,*  
*Honolulu, T. H.*

Gentlemen:—The attached rule concerning the control of certain insect and plant pests is respectfully presented for your consideration.

This rule is intended primarily to prevent the carrying of the recently discovered pest on the white ginger plant and the carrying of the Australian fern weevil from one locality to another throughout the Territory. It also includes a prohibition against the carrying of Spanish moss from one locality to another, and it is deemed advisable to place this prohibition on Spanish moss in lieu of the more drastic action of destroying all Spanish moss in the Territory, which it was intended to take in 1918, but which the Attorney General ruled could not be taken unless Spanish moss had actually proved to be a menace in this Territory.

Provision is made in this rule for exceptions in case it might possibly be determined that some of the prohibited articles might, under certain circumstances, be transported from one part of the Territory to another.

Chief Plant Inspector Ehrhorn and Entomologist Fullaway concur in this proposed rule.

Very respectfully,

C. S. JUDD,  
Executive Officer.

---

## The Australian Red Cedar

---

By C. S. Judd, *Superintendent of Forestry.*

One of the most promising of recently-introduced timber trees in Hawaii is the Australian red cedar, *Cedrela australis*, which has not the appearance of the usual cedar tree, as we know it, but which resembles the black walnut tree. It belongs to the same family as the Spanish cedar, which produces the fragrant wood with a cedar odor, and from which cigar boxes are made.

This cedar is a native of eastern Australia and is found in scattered belts on the volcanic soils and in the warmer localities

of Queensland and New South Wales, where the annual rainfall is over forty inches. There it does not form pure stands but is found mixed with other trees in the high forest over a dense underwood.

The tree coppices freely and vigorously and may be raised from cuttings without difficulty. It bears heavy crops of seed, usually every two years, and these being very light and winged, are readily distributed by the wind. One pound of red cedar seed contains about 70,000 seeds. This feature makes the tree particularly suitable for areas in Hawaii where it is desired to secure an extension of the forest by natural reproduction. The seed requires full sunshine for germination, and being intolerant of shade it will not grow under other trees. The power of the seed to germinate is not retained over a lengthy period and the seed must therefore be sown soon after it is harvested.

The seed, when fresh, has a very high percentage of germination, however, and the young seedlings exhibit very rapid growth, develop a strong root system and are very amenable to nursery treatment.

The Australian red cedar tree, shown in the accompanying illustration, is growing on Tantalus and is 30 feet high and  $4\frac{1}{4}$  inches in diameter at breast height,  $2\frac{3}{4}$  years from planting. Red cedar trees at Koloa, Kauai, have grown just as rapidly as neighboring eucalyptus trees, but have a larger stem diameter. In its native habitat the red cedar shows an average diameter growth of one inch per year over a period of 200 years and will attain a total height of 200 feet, a clear bole length of 100 feet, and a maximum diameter of over 10 feet.

The chief value of this red cedar is for its wood, which is very similar to mahogany but lighter. It is prized very highly in Australia for use in furniture and piano making, turnery, boat building, window blind frames, carriage and general house construction. It seasons well, is durable, is immune from boring insects, and is susceptible of a high polish. It is especially valued for the making of racing boat shells on account of its light weight and strength, and choice veneers are cut from the junction of the branches with the stem. The bark contains a considerable quantity of tannin, which produces a purplish leather.

The Australian red cedar, on account of its ease of propagation, rapid growth, and valuable wood products, gives great promise as one of the future timber-producing trees in the Territory of Hawaii. Fortunately, much progress has already been made toward its establishment in these islands. To Mr. E. C. Smith of Honolulu, who was familiar with the tree in his native country, must be given the credit for the introduction of the red cedar to these islands. In 1914 he imported 200 of the trees from Australia and these were planted at Kunia in Honouliuli, Oahu, in a region of very scanty rainfall. These were cultivated and cared for by the Kunia Development Company, under



Australian Red Cedar on Tantalus Ridge, Honolulu.





the direction of Mr. A. W. Van Valkenburg, and have shown excellent growth in the comparatively arid region where the irregular rainfall averages only about 30 inches a year.

Through the kind offices of the two above-mentioned gentlemen, a quantity of seed of the Australian red cedar was obtained in 1916 from Australia, and from these 25,000 seedlings were raised at the Government Nursery and distributed in February, 1917, to 20 interested tree planters on the six main islands of the group. In two or three years from now these trees should begin to bear seed, by the use of which the planting of this tree may be extended.

During the fall of 1919, the Forest Nurseryman secured a quantity of seed from one of the cedar trees planted at Kunia and which was only five years old. From this seed 13,000 seedlings have been raised and distributed for planting in different parts of Oahu. As soon as other red cedar trees are in bearing, additional quantities of seed will be sent out to the other islands for planting.

The Australian red cedar is recommended to any tree planter in the Territory who desires to establish a rapidly growing tree which has already been proved to grow well in this climate and which will yield him valuable lumber and other timber products.

---

## The Poisonous Plants of Hawaii

---

By J. F. Rock, *Consulting Botanist.*

The recording of the poisonous plants of the Hawaiian Islands is not a difficult task as, fortunately, the number of such plants is very small, and were it not for more or less recent introductions, the number would be still smaller.

Owing to the death of a soldier, which occurred recently and which was due to the effects of eating six castor beans, it was thought wise to publish a brief article on the few poisonous plants existing in the Territory, in order to prevent or warn people from either picking or thoughtlessly chewing or eating them.

The native poisonous plants are very few in number and may be enumerated as follows:

The first three species mentioned are practically the only native poisonous plants; to them must be added the kukui or candle-nut tree. All the others are of early or recent accidental introduction.

### AKIA (*Wikstroemia* spp.)

The genus *Wikstroemia* is an Asiatic one and is represented in the Hawaiian Islands by species which are usually found in the outskirts of the forests and dry open localities. Only two

or three, or possibly four, of which one represents perhaps an undescribed species, occur in the wet regions or rain forests. They are more or less easily recognized by the dull olive green foliage which is, however, quite variable in the different species, by the tomato-red drupes, which are oval and about a fourth of an inch long, and by the black bark, which is a very strong and unbreakable bast. Branches of these species cannot readily be broken off, but when broken the bark will peel off the stem or branch, leaving the white sap-wood exposed. The bark has a disagreeable odor and stains the hand green.

The Akia, as the natives call these species, was employed by them as a fish poison, similar to Auhuhu or HOLA. Apparently all parts of the plant are poisonous and contain a narcotic.

AUHUHU or HOLA (*Trephrosia piscatoria*).

The Auhuhu is a small leguminous plant with white flowers and small pods. It grows erect in pasture lands, especially in very dry situations near the sea on old lava flows, as on the west end of Molokai, at Koko and Diamond Head, and in the lower Waianae Mountains on Oahu and in dry situations on the lee-side of all islands. It is poisonous to stock and was used by the natives to stupefy fish. It contains a glucoside known as tephrosin  $C_{31}H_{26}O_{10}$  and perhaps also tephrosal  $C_{10}H_{16}O$ , which is toxic, especially to fish.

KIKANIA also POPOLO (*Solanum aculeatissimum*).

This Kikania or Popolo is not very common but is usually found in the lower forests and in scrub vegetation of the lowlands of all islands. It is a spiny plant, belonging to the potato family, with whitish flowers and bright scarlet fruit an inch or more in diameter. The fruit is poisonous, not to the touch, but if eaten.

KIKANIA (*Solanum sodomium*) or Apple of Sodom.

This species is very similar to the foregoing one but occurs in waste places only; it is a shrub up to four feet in height, of a globose outline; it is very spiny, has purplish pale flowers and bright yellow, apple-like fruits of over an inch in diameter. The fruit is quite poisonous.

COMMON NIGHTSHADE (*Solanum nigrum*).

This Popolo, which is more or less common in the lowlands, is usually found as a weed only a foot or so in height. The flowers are small and white and the small berries black and shining. The fruits are sometimes used for pies and preserves. It should, however, be used with caution and should never be used or eaten, if at all, until thoroughly ripe. Cases of poisoning have been recorded for calves, sheep and swine.

The plant contains an alkaloid solanin  $C_{32}H_{57}NO_{18}$ , which is

present in larger quantities in the fruit before it is entirely ripe. Solanidin  $C_{39}H_{61}NO_2$  is also present. The symptoms are stupefaction, staggering, loss of speech, cramps and sometimes convulsions. Death is due to paralysis of the lungs, but few cases are fatal.

#### POPOLO (*Solanum trifolium*)

This species is much more common than the foregoing, but is also confined to the lowlands. It is an annual weed with small whitish flowers and greenish black fruits (small berries). The berries are poisonous but no cases of human poisoning have been recorded.

#### JIMSON WEED or THORN APPLES (*Datura stramonium*)

A rank-scented, tall, narcotic herb with spiny ovoid-pointed capsules and tubular-funnel-shaped purplish flowers. The seeds of this plant are exceedingly poisonous and prove invariably fatal when eaten. The alkaloids are atropin and hyoscyamin, the active principle of belladonna. Persons have been poisoned by sucking the flowers or eating the seeds. The symptoms are nausea, dry, burning skin, dilated pupil, loss of sight, mania, convulsions and death. Vomiting is not a common symptom. The thorn apple occurs in waste places all over Honolulu and makes its appearance usually after or during the winter rains; it is found on all islands. Mention may also be made of *Datura suaveolens* and *Datura arborea*; both species are known in Hawaii as Angel's Trumpet. The large white pendant flowers make them conspicuous and both species are poisonous.

#### CASTOR OIL BEAN (*Ricinus communis*).

The well-known castor oil plant is very common about Honolulu, especially in waste places. The seeds furnish the well-known castor oil, a mild and safe purgative when refined. The seeds contain 50% of oil and an acrid poisonous substance, and three seeds have been known to cause death in man. The seeds are ten times more purgative than the oil. Recently, in Honolulu, a soldier died a few days after having eaten six seeds of this plant. The oil is not poisonous, but the pulp contains an acrid albuminous substance called *ricin*  $C_8H_8N_2O_2$ . The seeds have also caused death in horses.

#### POINSETTIA (*Euphorbia pulcherrima*).

The Poinsettia is also very poisonous, especially the latex or juice, and gardeners have often been severely poisoned while cutting the plants and handling them. A child is said to have died on Kauai, due to poisoning caused by sucking freshly cut stems of the Poinsettia.

#### KUKUI (*Aleurites moluccana*).

The Kukui, a well-known tree and easily recognized by its



very pale foliage and white to cream-colored flowers arranged in panicles, and large nuts, occurs on all the islands and forms often pure stands in the lowlands or lower forest zone. The nut when eaten raw acts as a strong purgative and contains poisonous properties and should not be eaten. The kernel, when roasted, is used as a relish by the Hawaiians, but not more than half a nut or less should be eaten. If eaten in quantity, or even a few raw nuts, poisoning symptoms will appear.

### YELLOW OLEANDER or BE-STILL TREE

(*Thevetia neriifolia*).

The Yellow Oleander is commonly planted near dwellings and resembles somewhat the Oleander on account of the narrow leaves. The flowers are funnel-shaped, yellow and fragrant, the odor reminding one of tuberose. The fruits are somewhat triangular and black when ripe. It is exceedingly poisonous, as it contains a powerful heart-poison, known as thevetin  $C_{54}H_{48}O_2$  and also theveresin. The milky juice is highly poisonous; the bark is a powerful febrifuge and acts also as an acrid purgative and emetic.

### OLEANDER (*Nerium indicum*).

The Oleander contains poisonous properties in all its parts; the odor of its flowers is also poisonous. It is a heart stimulant and acts like *Digitalis*. Stock and horses have been poisoned by eating the leaves; the amount necessary to cause death in horses ranges from 15 to 20 gm. of green leaves and more of dry leaves. In cows even a less amount is sufficient to cause death. The symptoms are a powerful heart stimulation which causes profuse perspiration, soreness of mouth and throat, the bowels act often, and death ensues usually in about twenty-four hours.

## Division of Forestry

Honolulu, February 6, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—I respectfully submit the following routine report of the Division of Forestry for the month of January, 1920:

### TREE PLANTING.

During January 285 koa trees were set out on the Makiki watershed and on the newly cleared area in the Waiahole Forest Reserve 490 kauri pine and 100 Japanese cedar seedlings were planted, making a total of 875 trees planted out during the month.

### FOREST FENCE.

The boundaries of the Kuliouou Forest Reserve, near the eastern end of Oahu, received attention during the month. This is a reserve of only



214 acres of government land, but it is important as an outpost of the forest on the Koolau Range to the west, and for this reason should receive the best possible protection from the ravages of stock, especially in view of the fact that it is somewhat exposed to the strong trade winds. Wild goats from the Waimanalo pali have in the past encroached on this reserve, but these have been largely killed or driven away from the reserve by constant hunting and very few now remain. Owing to breaks in the fences tame cattle from the adjacent ranches have also encroached on the reserve, but this is now impossible because the existing fences on the boundaries of adjacent lands, amounting to 1.42 miles, are now in stock-proof condition, and because of the construction of a new fence .40 mile long across the bottom of the valley adjacent to vacant public land. The Maunalua Ranch Co. cooperated in the repair of the fence on the Maunalua boundary and along the new fence a triple row of red gum trees was planted after the 14 head of cattle at large in the reserve had been driven out.

#### HAWAII TRIP.

One-half of the month was spent on Hawaii, as reported elsewhere, on the work of controlling the fern weevil at 29 Miles, in order to prevent its encroachment on the neighboring forest, and on the work of beginning the investigation of the infestation in and about Hilo. Negotiations were also begun for the construction of additional fencing along the volcano road in cooperation with the owner of adjacent private land.

#### FOREST PROTECTION.

At the request of Mr. Sorenson of the O. R. & L. Co., I supplied him, after a check field trip to Kahuku on January 7, with the approximate location of a line across the upper lands of Kahuku, recommended by my predecessor in 1910, as the proper line on which a fence should be constructed for the protection of the important forest cover on the mountains in this region.

#### FOREST FIRE.

On the night of January 25, a fire in Halawa was reported to me by telephone and I at once communicated with Fire Warden James Gibb of Aiea, who assured me that it was only a grass fire on a ridge which would burn out as soon as it reached the damper vegetation. This proved to be the case, for on inspecting the area the next morning the fire was completely out. It burned over approximately 25 acres of steep open grass land between the pineapples and the forest.

Respectfully submitted.

C. S. JUDD,  
Superintendent of Forestry.

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#### REPORT OF FOREST NURSERYMAN.

Honolulu, February 5, 1920.  
Superintendent of Forestry, Honolulu, T. H.

Sir:—I herewith submit a report of the work done during the month of January, 1920.

## NURSERY.

## Distribution of Plants—

	Transplants.	Pot-grown.	Total.
Sold .....	150	45	196
Gratis (including Forest Reserves)..	786	342	1,128
Total .....	936	387	1,324

## COLLECTIONS.

## Government Realizations—

On account of sale of plants.....	\$ 2.90
Rent of Office, Nursery Grounds for December, 1919....	35.00
Total .....	\$37.90

## Forestry and Forest Reserves, Preservation and Extension—

Kokee Camp Sites, Na Pali-Kona Forest Reserve, Kauai,  
Fees from 18 camp site holders, amounting to a total of \$344.00  
(Covering a period from January 1 to December 31, 1920.)

## PLANTATION COMPANIES AND OTHER CORPORATIONS.

The distribution of plants under this heading amounted to 11,000 in transplant boxes and 60,000 in seed boxes, a total of 71,000.

## MAKIKI STATION.

We have installed at Makiki Station the "Skinner System" of irrigation. This system is working very satisfactorily and we find that the small cost of installing it will, in a short time, remunerate us many times over, when we consider that there is much less labor required in doing the irrigation and this system does away entirely with the rubber hose.

Other work done at this station has been principally routine.

## HONOLULU WATERSHED PLANTING.

We have planted during the month in and around Opu Valley 285 koa trees. Other work consisted of hoeing and clearing, and clearing trails.

## ADVICE AND ASSISTANCE.

The writer has called at the different military posts around Honolulu, at the request of the officers in charge, for the purpose of giving advice in planting, etc.

Other advice given was as follows:

Calls made .....	6
Advice given by phone.....	5
Advice given to people calling.....	8

Respectfully submitted.

DAVID HAUGHS,  
Forest Nurseryman.

## Division of Entomology

Honolulu, February 3, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—During the month of January the insectary handled 19,300 pupae of the melon fly, from which there were bred 3,861 females and 2,790 males, *Opius fletcheri*.

The distribution of parasites was as follows:

### *Opius fletcheri*.

Oahu:	Females.	Males.
Moanalua .....	1,610	1,435
Moiliili .....	580	520

### *Diachasma tryoni*.

Waikiki .....	100	100
Palama .....	50	50
Kalihi Valley .....	350	300
Maui:		
Kula .....	200	200

### *Diachasma fullawayi*.

Oahu:		
Waikiki .....	30	30
Kalihi Valley .....	75	75
Maui:		
Kula .....	20	20

### *Opius humilis*.

Oahu:		
Waikiki .....	50	50
Kalihi Valley .....	100	100
Maui:		
Kula .....	50	50

### *Dirhinus giffardi*.

Oahu:		
Nuuuanu .....		100

### *Galesus silvestri*.

Oahu:		
Nuuuanu .....		2,000

### *Tetrastichus giffardianus*.

Oahu:		
Waikiki .....		500
Palama .....		100
Kalihi Valley .....		2,100
Maui:		
Kula .....		200

*Paranagrus osborni.*

Oahu:

Makiki Nursery ..... 1,200

Respectfully submitted.

D. T. FULLAWAY,  
Entomologist.

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Division of Plant Inspection

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Honolulu, January 31, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—I respectfully submit my report of the work carried on by the Division of Plant Inspection for the month of January, 1920, as follows:

During the month 57 vessels arrived at the Port of Honolulu, 20 of which carried vegetable matter and 9 vessels came through the Panama Canal Zone. The following disposal was made of the various shipments:

Passed as free from pests.....	638 lots	12,031 pkgs.
Burned .....	70 "	70 "
Fumigated .....	9 "	36 "
Returned .....	7 "	15 "

Total Inspected .....	724 "	12,152 "
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Of these shipments 11,897 packages arrived as freight, 135 packages as mail and 120 packages as baggage.

## RICE AND BEAN SHIPMENTS.

During the month 285 mats of rice from China and 1395 bags of beans from Japan arrived and were found free from pests.

## PESTS INTERCEPTED.

Approximately 3330 pieces of baggage belonging to immigrants from foreign countries were examined, from which 43 lots of fruit and 19 lots of vegetables were seized and destroyed.

On January 7, per Tenyo Maru, two plants found in the baggage of immigrants from Japan and China were seized; one was returned on board the steamer, the other was destroyed. One lot of seeds in the baggage of a passenger from China was seized and destroyed. In the mail was found a package of barley, a package of wheat and a package of rice seed, all from Japan. These were seized and destroyed, being prohibited under Quarantine Order No. 39, of the Federal Horticultural Board. A package containing a lemon and a piece of horseradish was also found in the mail from Japan and destroyed. Three bags of beans and a bag of chestnuts in the mail from Japan were fumigated as a precaution.

On January 15, per Nile, a package of nuts and a package of beans in the mail from Japan were fumigated as a precaution.

On January 20, per Ecuador, 30 baskets of caladiums in the cargo from China were found infested with aphid and fumigated.

On January 27, per Ventura, 9 coconuts found in the baggage of a passenger from the Colonies were returned on board the steamer. These had sprouted and were therefore classified as plants. A potato found in the mail from New Zealand was seized and destroyed, as it appeared to be diseased.



## HILO INSPECTION.

Brother M. Newell, Inspector at Hilo, reports the arrival of four steamers at Hilo. Two steamers carried vegetable matter, consisting of 53 lots and 882 parcels, all passed as free from insect pests.

## KAHULUI INSPECTION.

Mr. Will J. Cooper, Inspector at the Port of Kahului, reports the arrival of 7 vessels. Three steamers carried vegetable matter, consisting of 12 lots and 1008 parcels, all being found free from infestation.

## INTER-ISLAND INSPECTION.

Fifty-eight steamers plying between Honolulu and the other island ports were attended and the following shipments passed as free from infestation:

Taro .....	583 bags
Vegetables .....	351 packages
Fruit .....	159 "
Plants .....	80 "
Seed .....	22 "
Sugar Cane tassels .....	3 bags

Total Passed .....1198 packages

Six packages of plants and ferns were refused shipment on account of infestation, undesirable soil and not complying with the regulations.

Respectfully submitted,

E. M. EHRHORN,  
Chief Plant Inspector.

## Division of Animal Industry

Honolulu, February 6, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—I beg to submit herewith my report on the work of the Division of Animal Industry for the month of January, 1920:

A wireless was received from the Deputy Territorial Veterinarian on Maui on January 2nd, stating that "black leg" had broken out among the thoroughbred cattle in the Makawao district and requesting my presence there. Under authorization of the President of the Board, I left the same evening for Kahului and found upon my arrival that one pure-bred Hereford heifer and one steer had died. A post-mortem examination was made on the heifer, which had only been dead for a few hours, with the following results: The carcass, which was in first-class condition, was considerably swollen, especially along the under side of the neck, the breast and the fore legs. The swelling was edematous and contained considerable amount of air bubbles.

Upon incision, the muscles were found to be discolored, in places being purple or nearly black, and in others of pink to red shade. The blood was very dark but well coagulated. The internal organs presented the characteristic symptoms of hemorrhagic septicemia, the lungs especially being very hemorrhagic and the lymph glands being swollen and discolored and surrounded by gelatinous exudations. The spleen was not enlarged.

As a result of these observations the diagnosis of hemorrhagic septicemia combined with malignant edema was made. The carcass was burned and every precaution taken to destroy the infection in the stables and in the yard where the sick animals had been kept.

The vaccination with hemorrhagic septicemia bacterins was recommended and, up to the present writing, no further cases have occurred.

On January 22, Dr. Case reported that while testing a large dairy herd of cattle at Wahiawa, he found three reactors, all being cows which had been purchased in South Kona about six weeks previous. One of these animals when butchered was found so badly affected with tuberculosis that the entire carcass had to be condemned. As the herd in question has been free of tuberculosis for a number of years, it is, of course, unfortunate that the disease should have been introduced again with these Kona cows; and it is recommended that a regulation be promulgated prohibiting the shipment of dairy cattle from one island to another unless they come from clean herds or else have been tuberculin tested previous to shipment.

A considerable number of cows come to Honolulu from South Kona, but, up to this time, very few reactors, in fact not more than half a dozen, have been found among them. The present case, however, of three cows all being badly affected, would seem to indicate that the ranch from which they came must be very badly infected, and steps were taken without delay to have the Deputy Territorial Veterinarian for that district begin testing the said herd and, in fact, to give as much of his time as possible to the testing of all dairy herds in that district.

A copy of the proposed regulation is herewith submitted for the approval of the Board.

Very respectfully,

V. A. NORGAARD,  
Territorial Veterinarian.

#### REPORT OF ASSISTANT VETERINARIAN.

Honolulu, January 31, 1920.

Dr. V. A. Norgaard, Chief, Division of Animal Industry,  
Bureau of Agriculture and Forestry, Honolulu, T. H.

Sir:—I have the honor to submit the following report for the month of January, 1920:

#### TUBERCULOSIS CONTROL.

The following cattle have been tested during the past month:

	Tested.	Passed.	Con- demned.
J. T. Waterhouse .....	1	1	0
Kualoa Ranch .....	278	273	5
Miss F. Johnson .....	2	2	0
John Schwenek .....	6	6	0
P. A. Ornellas .....	15	15	0
K. Murakamia .....	16	16	0
Kemoo Farm .....	5	2	3
Geo. E. Newman .....	1	1	0
James Gibb .....	11	11	0
R. McKeague .....	5	5	0
K. Toyama .....	17	17	0
A. L. C. Atkinson .....	22	22	0
Frank de Mello .....	20	20	0
S. Saito .....	9	9	0
L. Rodrigues .....	2	2	0
Jose de Santiago .....	1	1	0
Miguel Leina .....	2	2	0

Jose Silva .....	3	3	0
John Vasconcellas .....	1	1	0
Jules Nasimenta .....	3	3	0
Joe Riviera .....	1	1	0
Monsarrati Figuor .....	3	3	0
Estebar Ortiz .....	2	2	0
Frank Manchu .....	1	1	0

From the above list it will be seen that a total of 430 cattle were tested, out of which number 422 were passed and 8 condemned and branded.

Besides the above work, 29 post-mortem examinations were made on cattle condemned for tuberculosis.

#### IMPORTATIONS OF LIVE STOCK.

Out of 46 vssels boarded by the Live Stock Inspector, the following were found to carry live stock for this port:

S. S. Lurline, San Francisco—20 Holstein cows and 1 calf, Alexander & Baldwin; 1 Jersey cow, J. T. Waterhouse; 26 cts. poultry.

S. S. Sachem, San Francisco—2 cts. poultry.

S. S. Matsonia, San Francisco—1 dog, American Express Co.; 1 canary bird.

S. S. Mauna Kea, Hilo—1 dog, Mrs. Eller (ex. S. S. Enterprise).

S. S. Pensacola, San Francisco—1 dog, Lt. Kilmer.

S. S. Hyades, San Francisco—16 cts. poultry.

S. S. Lurline, San Francisco—3 horses, U. S. Army; 3 Duroc-Jersey hogs, L. L. McCandless; 63 cts. poultry.

Respectfully submitted,

LEONARD N. CASE,  
Assistant Territorial Veterinarian.

## By Authority.

#### TERRITORY OF HAWAII.

#### BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY.

#### RULE XIV—DIVISION OF ANIMAL INDUSTRY.

Under authority of Section 503 of the Revised Laws of Hawaii, 1915, the Board of Commissioners of Agriculture and Forestry hereby issues the following regulation to prohibit inter-island shipment of dairy cattle affected with tuberculosis:

Sec. 1. No dairy cattle shall be shipped from one island to another unless accompanied by a permit issued by the Territorial Veterinarian, or his deputy, on blanks supplied by this Board.

Sec. 2. Such permit shall certify to the freedom from tuberculosis of the animals in question as proven by the tuberculin test within one week previous to shipment, or certify that the animals come from a herd which has passed the tuberculin test successfully twice within the preceding eighteen months.

Sec. 3. The Territorial Veterinarian, or his deputy, shall on request of the owner or shipper, issue a permit to ship untested but apparently healthy cattle *in quarantine*, such cattle to be kept segregated on

premises approved by said officer at the point of destination until tuberculin tested and released by him.

Sec. 4. It shall be the duty of the owner or consignee to make sure that the said permit reaches the Territorial Veterinarian, or his deputy, before removal of the cattle from the wharf where landed, and the master, owner or agent of the vessel carrying such cattle shall not allow such removal until authorized by said officer.

Sec. 5. The Territorial Veterinarian or his deputy issuing such certificate shall furnish a copy of the same to the local agent or the master of the vessel accepting such shipment and shall mail or forward another copy without delay to the Territorial Veterinarian or his deputy at the place of destination.

Sec. 6. This rule shall take effect upon its approval by the Governor.

Approved this 25th day of February, 1920.

CURTIS P. IAUKEA,  
Acting Governor of Hawaii.

Honolulu, T. H.

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## By Authority

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### TERRITORY OF HAWAII.

#### BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY.

#### RULE XXI—DIVISION OF PLANT INSPECTION.

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#### RULE AND REGULATION OF THE BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY CONCERNING THE CON- TROL OF CERTAIN INSECT AND PLANT PESTS.

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The Board of Commissioners of Agriculture and Forestry of the Territory of Hawaii hereby makes the following rules and regulations for the purpose of controlling certain insect pests and plant pests in the Territory of Hawaii:

Section 1. No ginger plant or part thereof, no fern plant or part thereof, and no Spanish moss (*Tillandsia usneoides*), otherwise known as Florida moss or old man's beard, shall be carried, transported, or shipped from any one island in this Territory to any other island in this Territory, except by special written permit from the Board of Agriculture and Forestry.

Section 2. No ginger plant or part thereof, no fern plant or part thereof, and no Spanish moss shall be transported in any manner from one part or locality of any island to another part or locality of the same island, except by special written permit from the Board of Agriculture and Forestry.

Section 3. Inspectors and other duly authorized agents of the Board of Agriculture and Forestry are hereby empowered to examine and inspect all freight, baggage, and belongings leaving or arriving at any port of the Territory or being transported from one part or locality of any island to another part or locality of the same island and to destroy any and all ginger plants or parts thereof, and any and all Spanish moss found among or in such freight, baggage and belongings.



Section 4. Any person violating the above rule shall be guilty of a misdemeanor and upon conviction thereof shall be punished by a fine not to exceed Five Hundred Dollars (\$500.00) as provided by Section 529 of the Revised Laws of 1915.

Section 5. This rule shall take effect upon its approval by the Governor.  
Approved this 25th day of February, 1920.

CURTIS P. IAUKEA,  
Acting Governor of Hawaii.

Honolulu, T. H.

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# THE HAWAIIAN FORESTER AND AGRICULTURIST

APRIL, 1920

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# THE HAWAIIAN FORESTER AND AGRICULTURIST

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VOL. XVII.

HONOLULU, APRIL, 1920.

No. 4

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The Forest Nurseryman distributed 64,200 trees during February to different tree planters on Oahu.

The work of eradicating the Australian fern weevil on the infested area at 29 Miles, Oloo, Hawaii, was continued during February.

The second and last installment of an article on the poisonous plants of Hawaii by Consulting Botanist J. F. Rock appears in this issue.

Methods of securing a natural enemy on an insect pest are ably related by Entomologist Fullaway in an article appearing in this number.

The mountain apples, *ohia ai*, ripening during April in the Oahu valleys, are ahead of the season this year by about three months due probably to some influence of the prolonged drought of last fall and winter.

The attention of those who desire trees for planting on the several different islands is called to the new notice of the Division of Forestry appearing in the front part of this issue.

The wiliwili tree of the dry sections of these islands is famous for its red blossoms, scarlet seeds, and very light wood. Further details concerning this tree are presented in a special article by the Superintendent of Forestry which appears in this issue.

The feeding of salt beef or salted meat to hogs is dangerous and an instance of the fatal results of this practice is described in the routine report of the Territorial Veterinarian in this number.

The attention of the Division of Forestry is now being directed to the undesirable spread of Hilo grass into forest areas by the use of trails and means are being studied for overcoming this menace to our native forests on the more important water supply areas.

Infectious abortion in cattle has unfortunately made its appearance on Oahu. Every effort is being made to control it by the use of an effective vaccine, a supply of which was secured at once upon the discovery of the disease here.

The native wild begonia, *akaakaawa*, was found early in April to be in full bloom in the shaded ravines at Kokee, Kauai, and on the forest trail to Kalalau Valley. Its delicate pink and white blossoms showing above the solid banks of ferns made a charming picture not often seen in a Hawaiian forest. The yellow blossoms of the *poolaunui*, in the same region, also presented a pleasing contrast to the usual abundance of green verdure.

The long-standing problem of removing wild cattle from the Kula Forest Reserve, Maui, and keeping them out has at last been solved by fencing. At the higher elevations on Haleakala above heavy timber growth wild cattle apparently do very little damage, but a close examination of almost every young mamani tree will show that it has been severely cropped and consequently stunted in growth by the repeated browsing of cattle.

## Plant Inspection Notes

By E. M. EHRHORN, *Chief Plant Inspector.*

Quarantine Notice No. 39 with regulations of the Federal Horticultural Board prohibits the importation of seed or paddy rice and all species and varieties of wheat, oats, barley and rye, in the raw or uncleaned or unprocessed state, from Australia, India, Japan, Italy, France, Germany, Belgium, Great Britain, Ireland and Brazil on account of two dangerous plant diseases known as flag smut (*Urocystis tritici*) and take-all (*Ophiobolus graminis*). Wheat, oats, barley and rye may be imported from the countries named only under permit and upon compliance with the conditions prescribed in the regulation of the Secretary of Agriculture.

Several small packages of rice seed or paddy, as well as wheat and barley, have been seized in the mail and have been destroyed as contraband. All those interested in such shipments should notify their friends residing in the countries mentioned above not to send any of the seed tabulated as prohibited.

### SCABBY POTATOES.

Within the last two months some potato shipments from the mainland showed a very bad infestation of potato scab and were



returned to the shipper. Potato scab is found in the Islands and much depends on the individual grower to prevent his potato crop from being ruined by this disease. All potatoes used for seed should be free from any scab and should be treated before planting. The best treatment is to immerse the seed potatoes for two hours in a solution of 8 ounces formaldehyde to 15 gallons of water and then let the potatoes be spread out to dry before planting. If possible potatoes should not be planted on the same ground which grew a potato crop the previous year, especially if the crop showed any sign of potato scab.

### POTATOES AFFECTED WITH NEMATODES OR EELWORMS.

The nematode or eelworm has been in the Islands for some time. Many of the tender roots of vegetables and flowering plants show the tuber-like swellings and soon perish. This pest is getting well started on the Coast and especial damage is noted to potatoes. Recently a shipment from San Francisco was returned on account of being badly infested. The nematode or eelworm occupies the outer layer of the potato to a depth of about one-quarter of an inch. When present in large numbers in the potato, the surface is more or less covered with small elevations or pimples, which contain many eelworms and a tuber could contain a great many thousand of these worms.

The serious side of this infestation arises through the distribution of the diseased potatoes and the use of these especially as seed for new crops. All those interested in the growing of potatoes in these Islands should use every care not to buy either scabby potatoes or those infested with eelworms. The Division of Plant Inspection will gladly examine samples of seed potatoes for the grower and advise him as to the best methods for disinfection.

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## Book Review

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HAWAII NEI 128 YEARS AGO, by Archibald Menzies, has recently been attractively published by Mr. W. F. Wilson of Honolulu, who last year also made available to the public an account of David Douglas' visits to Hawaii. The volume of some 200 pages, profusely illustrated, presents the journal of Archibald Menzies on his three visits to these islands in the years 1792 to 1794 while he was acting as surgeon and naturalist on board H. M. S. Discovery under Captain Vancouver. Menzies had been here twice before.

The first of the journal relates of a period 28 years before the first missionaries arrived and 33 years before Ellis and his companions made the circuit of Hawaii. Menzies had an excellent opportunity to study the islands at a time when taboos were rife and conditions were still very much the same as at the date of Captain Cook's visits. His observations on the leading Hawaiian kings and chiefs and the primitive manners and customs of the people are presented in a very interesting manner. The modern spelling of Hawaiian names has happily been adopted by the publisher, which greatly facilitates the reading of the journal.

The reader may be somewhat disappointed, however, in not finding in the journal a greater wealth of botanical description, especially in view of the fact that 19 species and varieties of Hawaiian plants, including one of the famous tree ferns, have been named after Menzies.

Menzies did much, however, to improve the flora of the islands for the immediate benefit of the early Hawaiians, for he distributed vegetable seed which he brought with him from England and landed young orange trees, sprouted on board his vessel from seed secured at the Cape. On his later voyage he had the satisfaction of seeing these growing successfully.

In connection with the introduction of cattle and sheep by Captain Vancouver, an interesting episode is related in the journal concerning their first progeny. In 1793 the first calf was born in Kona and the natives, in their eagerness to show it to Kamehameha, carried it overland to Hilo, feeding it during the several days of the journey on fish and water. Menzies relates that the calf survived this separation from its mother and even waxed fat on the unusual diet.

Probably the most interesting facts brought out by the volume are that Menzies was the first educated white man to explore the interior of Hawaii and West Maui, the first to scale Hualalai, and the first white man, and very likely the first human being, to reach the summit of Mauna Loa. His accounts of these adventures make very good reading.

C. S. J.

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*The Hardwoods of Australia and Their Economics.* By Richard T. Baker, Curator and Economic Botanist, Lecturer on Forestry, Sydney University, and author of several other works on Australian flora.

This is a splendid quarto volume from the government printing office of New South Wales, issued under the auspices of the Technological Museum of that state. Impressed upon heavy calendered paper its 522 pages, including an exhaustive index, the book is bountifully illustrated with views of standing trees and sections of the different kinds of wood. There also are many natural color plates of the grain of the various hardwoods used in the arts.





Wiliwili trees at Lualualei, Oahu.



"The object of this work," the preface sets forth, "is primarily to arouse a keener interest in, and to make known to Australians in particular and the world in general, the diversity of hardwoods with which nature has endowed this wonderful continent." According to remarks in the introduction, the softwoods form such a comparatively small proportion of Australian forests that one is quite safe in saying that the prevailing feature of the woods is their hardness. At that the number of distinct hardwoods is comparatively small, the author further remarking that, "for so vast a continent it is remarkable that the number of species of trees is not by any means great, particularly when compared with some of the Pacific group of islands, such as the Philippines, where, according to Major E. P. Ahern, there are found 2,000 tree species, while the United States and Canada have less than 700. From a rough computation Australia has probably less than 500." Genera containing large numbers of tree species, it is stated, are very few, the genus which stands out in great predominance as a timber yielder being eucalyptus, the described species of which probably number 200.

Hawaii is indebted to Australia for some of its valuable lumber trees, the Australian red cedar, a softwood, having been the subject of an illustrated article in the March number of this magazine.

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## The Wiliwili Tree

---

BY C. S. JUDD, *Superintendent of Forestry*

The most delightful native tree seen by the traveler during the spring months in the arid sections of the Hawaiian Islands is the wiliwili tree, *Erythrina monosperma* Gaud., which stands out with its wealth of crimson blossoms as a very conspicuous object in the surrounding bleak landscape. This is one of the few Hawaiian trees that is deciduous, i. e., that drops its leaves. This happens in the fall and the blossoms appear on the bare branchlets from early spring to June or July before the new leaves appear so that the tree is never, or very rarely, in leaf and blossom at the same time.

The wiliwili belongs to the genus *Erythrina* (from the Greek word meaning "red") which has 30 species well distributed over the tropics. There is only one species in these islands, the *E. monosperma* (one-seeded) which is a misnomer because the pods which are hard and woody and dehisce on the tree contain often as many as 3 or 4 seeds. The same species is also found in Tahiti and New Caledonia.

The tree belongs to the bean family and the papilionaceous (butterfly-like) blossoms vary in color from an orange scarlet to pale yellow. There is no perceptible difference in the trees having blossoms of different shades, but the Hawaiians say that the wood of those with scarlet blossoms is slightly harder and more durable than the other.

The trifoliate leaves which are ovate or deltoid, broader than long, and of a dark green color when the tree is in foliage, cover the spreading crown which casts a welcome shade. The brilliant blossoms occur near the ends of the branches and these mature into pods a few inches long which upon reaching maturity open by becoming spirally twisted by action of the heat of the sun which shines from a cloudless sky wherever the wiliwili occurs. This dehiscence exposes the bright scarlet seeds which remain attached to the pods on the tree for a long time so that often one may find the brilliant seeds mixed in with new blossoms. The gayly colored seeds are often strung into very attractive necklaces.

The wiliwili tree occurs in clumps or as individuals up to 1,500 feet in elevation in the hottest and driest districts on the lee side of all the Hawaiian Islands. It grows luxuriantly in such regions where few other trees could exist and is frequently found coming up along water-courses or on the flat plain where freshets have washed down the seed from the parent tree further inland. The tree attains a height of from 20 to 30 feet and the short trunk is often 3 to 4 feet in diameter. The tree usually has a broad spreading crown composed of stiff, gnarled, whitish green branches, and both trunk and limbs are frequently armed with short, stiff horns. The trunks are often a dirty orange yellow in color.

A related species, *Erythrina indica*, has been introduced and planted in and about Honolulu. This is called the "Coral Tree" on account of the color and resemblance of the blossoms to the red coral, and also "Tiger's Claw" on account of the claw-shaped flowers. This has pods from 4 to 8 inches long which contain several dark carmine colored seeds and which do not open but fall off entire from the tree. The wood of this species is used in Guam for making troughs and in Samoa the dead, dry wood is used for keeping fire in native houses, as it will smolder for a long time without going out. In Samoa also and in other islands of the Pacific, the natives reckon the change of seasons by the flowering of this tree.

The wiliwili tree in Hawaii is probably best known because of its wood which is the lightest of any of the island trees. The wood, although soft and about as light as cork, was much used for the *ama*, the float of the outrigger canoe for which purpose it was admirable. The wood was also used for floats for fish nets, for carved stools placed under the canoe when drawn up on the beach or laid up in the canoe house, and for the narrower



Wiliwili tree on Kahoolawe.





surfboards, which Ellis says were the best, because of their light weight. In the early days the branches were used in the erection of fences by cutting slips and setting them in the ground. These took root and sprouted and formed a living fence which was permanent.

The supply of wiliwili trees has been greatly depleted because the larger ones have been cut for outrigger floats. Formerly this was a common tree on the rocky hills and dry plains in the lower open lee regions on all the islands, but it is now becoming somewhat rare.

The wiliwili is a tree well worth cultivating for its beautiful blossoms and handsome seeds and is easy to raise from the bean.

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## The Poisonous Plants of Hawaii

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BY J. F. ROCK, *Consulting Botanist.*

(Concluded.)

### STAR OF BETHLEHEM (*Isotoma longiflora*).

This rather attractive herbaceous plant with long, tubular white scented flowers has been in cultivation on the Island of Hawaii, especially in Hilo. The seeds of this species are very minute and are easily dispersed by both wind and birds, which accounts for its spreading over pasture lands in the vicinity of Hilo and to vacant lots in the town proper. It is a native of the West Indies and is one of the most poisonous plants found in Hawaii. So far as the writer is aware, no chemical analysis has been made, but that the plant is exceedingly poisonous (not to the touch) there is no question. It belongs to the order *Lobelioideae* or *Lobelia* family.

### CORAL BUSH (*Jatropha multifida*).

A member of the *Euphorbia* family and extremely poisonous. It is often called the coral tree on account of its scarlet flowers. The leaves are deeply divided, hence the name *multifida*. The fruits and juice of this plant are extremely poisonous, especially the former. A little Japanese boy, ten years old, died of the effects from eating a couple of fruits of this species in Nuuanu Valley last summer. The fruits are yellow and of the size of a walnut. The species is in cultivation in Honolulu, but is not common. It is a native of tropical America.

PINHOEN OIL TREE OR CUBAN PHYSIC NUT  
(*Jatropha curcas*).

This small tree with somewhat fleshy stem and branches is found wild in valleys on the windward side of the Island of Hawaii, but is by no means common. In Guam the writer saw this plant employed as a hedge plant and it is one of the commonly-met-with species. The seeds of this species are said to be edible, but when eaten in excess produce serious trouble and death often results. They are nutty and have a pleasant flavor. The fruits are of the size of a walnut, yellowish and somewhat fleshy and of the same size as those of *Jatropha multifida*.

SAND-BOX TREE (*Hura crepitans*).

This medium-sized tree, which belongs to the same family as the foregoing species, is rare in Honolulu where only it is cultivated. The male and female flowers, the latter consisting of a pistil only without a corolla, are borne on the same tree but on different branches. The fruit is a capsule of many compartments. The sap of this species is extremely poisonous and when applied to the skin produces eruptive pustules resembling those of erysipelas. It is exceedingly injurious to the eye and is said to cause blindness. It contains an acrid poison and when taken internally produces vomiting and diarrhea. The seeds are employed as an emetic.

APPLE OF PERU (*Nicandra physalodes*).

The plant in question, which has no common name, is a weed in and about Honolulu, especially common at Kaimuki. It is an annual and the fruits, enclosed in their papery calyx, resemble very strongly the well-known *Poha* or Cape Gooseberry. The plant is from two to five feet in height, the leaves are angular or sinuate toothed; the flowers are pale blue and rather large; the fruit is a globular dry berry, the calyx becomes enlarged and is bladder-like in fruit. It is said to be poisonous and is used as a fly poison in the United States.

RAGWEED (*Ambrosia artemisiifolia*).

This very common rag or stink weed which has made its appearance on Oahu and Molokai, is especially common along the government road between Honolulu and Haleiwa; in the latter place it is very abundant.

While it is not exactly poisonous, it is an astringent and a stimulant and causes hay-fever; the cause being in all probability the pollen which is produced in great abundance and is irritating to the air-passages of many people.

THE YARROW (*Achillea millefolium*).

This European weed has of late made its appearance on Hawaii where the writer found it along the Volcano road. It is considered poisonous though sheep will eat the weed.

It seems to have a decided action on the blood-vessels, especially in the pelvis. It is stated that it causes burning and raw sensations of the membrane with which it comes in contact, giving considerable pain in the abdominal regions, accompanied by diarrhea and enuresis. The alkaloid principle is *achillein*,  $C_{30}H_{38}N_2O_{15}$ .

BLACK-EYED SUSAN (*Abrus precatorius*.)

This vine, which is more or less common in Honolulu, belongs to the bean family or *Leguminosae*. The seeds are small, the size of a pea, red in color and have a black spot, hence the name. The poisonous substance found in the seeds of this species is a toxalbumin called *abrin*. It is considered a fish poison and is employed similarly to the *Auhuhu* or *Hola*.

The toxalbumin *abrin* is similar to that of the castor oil plant known as *ricin*, this latter is more poisonous than strychnine and prussic acid. It may not be out of place to make further mention of *ricin*, although the plant has been discussed in the first paper. The following is said about *ricin*, by Blyth: "If castor oil seeds are eaten, a portion of the poison is destroyed by the digestive processes: a part is not thus destroyed, but is absorbed, and produces in the blood vessels its coagulating property. Where this takes place, ulcers naturally form, because isolated small areas are deprived of their blood supply. These areas becoming dead, may be digested by the gastric or intestinal fluids, and thus, weeks after, death may be produced. The symptoms noted are nausea, vomiting, colic, diarrhea, teresmus, thirst, hot skin, frequent pulse, sweats, headache, jaundice, and death in convulsions or from exhaustion."

The toxalbumin in *Abrus precatorius* causes similar effects and symptoms. The *abrin* when applied to the conjunctiva causes coagulation in the vessels and a secondary inflammation.

Dr. Warden of India, who experimented with the poisonous properties of the plant, found that half a seed rubbed down with a small quantity of water and injected into the thigh of a full-grown cat produced fatal effects in 24 hours.

PUAKALA (*Argemone mexicana*).

The Mexican Poppy or *Puakala* is native in Hawaii, but is also found in Mexico and Texas. It occurs in dry waste places, especially near Koko Head, the Waianae region and other dry localities, but is restricted to the lowlands.

The yellow milk of this plant contains narcotic principles such as morphine. The natives employed the latex in cases of toothache; a few drops would be placed in the cavity of the offending tooth.

### PRIDE OF INDIA (*Melia azedarach*).

This ornamental tree is said to be poisonous and it is said that hogs have been poisoned by eating the seeds.

### POORMAN'S OR SHEPHERD'S WEATHER GLASS OR PIMPERNEL (*Anagallis arvensis*).

This prostrate little herb with opposite leaves and reddish flowers, a member of the Primula family, is very common in the meadows and pasture lands on all the islands. The plant is of more or less recent introduction, as it is not mentioned in Hillebrand's Flora of the Hawaiian Islands. It is known to be poisonous and to contain glucoside cyclamin. It is considered a fish poison, as it is used in intoxicating fish. It is used in cerebral affections, leprosy, hydrophobia, dropsy, epilepsy and mania. It produces, if taken internally, inflammation of the stomach.

### MILK-BUSH (*Euphorbia tirucalli*).

An African tree with round stem and smooth branches which are green and usually leafless; the leaves when present are very small and inconspicuous. The juice of this tree is very poisonous and causes excruciating pain if it gets into cuts in the skin or in the eye and is apt to destroy the eyesight. There are very few plants of this kind in Honolulu. The largest clump known to the writer is in the vacant lot opposite the Moana Hotel.

### SAMUDRA (*Barringtonia asiatica*).

A large and handsome tree cultivated in Honolulu. The large fruits with their fibrous quadrangular husk is considered poisonous. The bark of the tree contains a narcotic and is used in stupefying fish without killing them.

### WILD SWAMP VIOLET (*Hydrocotyle asiatica*).

This plant is one of the most common weeds found in lawns and pastures on all the islands, especially in the wetter regions. It is also known under the name of Asiatic Penny-worth. The plant was known to Sanskrit writers of very remote times and was even then regarded as useful in skin diseases. But in 1852 its virtues were first made known by Boileau, in the treatment of leprosy. The drug prepared from this plant if administered



produces diuretic effects, a general stimulation of the circulation and finally intense itching; larger doses produce considerable giddiness, spasmodic contraction of the larynx, palpitation of considerable violence and tetanic spasm of the trunk and limbs.

## The Melon Fly

### ITS CONTROL IN HAWAII BY A PARASITE INTRODUCED FROM INDIA.

BY DAVID T. FULLAWAY, *Entomologist*.

(From Report of the Proceedings of the Third Entomological Meeting,  
held at Pusa, India, February, 1918.)

The Hawaiian Islands are situated in the midst of a vast ocean. They are completely isolated from the continent, so that insects detrimental to agriculture cannot easily reach them. But with the development of trade on the Pacific, the Islands have become a commercial crossroads, a day seldom passes without a steamer putting into our main port, and despite the strict inspection and quarantine of horticultural products a serious pest now and then does slip in. Our equable climate permitting almost continuous breeding, an excessive multiplication and rapid spread of the pest soon result. Thus it was that the melon-fly (*Bactrocera cucurbitae*) gained access to the islands about 1895, and thereafter melons of any sort could not be grown successfully. A somewhat similar experience later with a more destructive insect, the Mediterranean fruit-fly, aroused public interest to the extent of inducing the Government to experiment with the possibility of controlling the injuriousness of the fly by searching out and introducing its parasites, that is to say, other insects that were known or could be ascertained to live at the expense of the first. Parasitism among insects is a very common phenomenon, which even the layman today is acquainted with, and the check which this parasitism exerts on the multiplication of insects is also well known. It should be pointed out here that the same circumstances which prevent the migration of injurious insects to our isolated islands, also prevent beneficial insects from reaching us. Likewise, the same causes which lead to the rapid spread and excessive multiplication of injurious introductions operate equally on the beneficial ones that prey upon them. In other words, the method of controlling injurious immigrant insects by the introduction of their parasites is particularly applicable to Hawaiian conditions. The experiment that was tried with the Mediterranean fruit-fly was successful to a very

large degree and induced the Government to go further and see what could be done to control the ravages of the melon-fly. In this way the writer was engaged in July, 1915, to investigate the parasitism of the melon-fly and obtain whatever natural enemies could be discovered.

Before going on to the detailed account of the expedition, it should be stated that when the search for melon-fly parasites was begun, our knowledge of the fly outside of Hawaii was very limited, consisting almost wholly of the probable distribution of the fly gained from the meagre records of Compere and Muir and the publications of the Imperial Entomologist of India. Nothing positive was known of parasites, although Muir's accounts of the relative scarcity of the fly in certain localities gave a measure of confidence to the assumption that parasites existed.

In regard of the facilities offered by the Government laboratories in India, it was considered that it would be the country to work first, and on 23rd July I set out with the intention of going directly to Pusa in India. When I reached Manila, however, I went up to Los Baños to have a conference with Muir, and it was largely on his recommendation that I decided to work first around Singapore.

While at Hongkong, 17-20th August, on my way to Singapore, I made a short trip up the river to Macao, where Muir and Kershaw had worked considerably, to determine its suitability as a breeding station on my probable return with parasites.

Leaving Hongkong on the 20th, I arrived at Singapore on the 26th, located a supply of infested fruit in some Chinese vegetable gardens, and set up my laboratory in a room over the hotel garage. Here I worked over a month, rearing melon-flies out of cucumbers and a few *Momordicas* and *Luffas*. At the end of a week on opening some of the puparia, I found a single female *Opius*, and shortly after two males, and felt encouraged to go on. However, although more than 6,000 flies were reared, no further parasites were obtained, and I decided to continue on my way to India. I attribute the meagre results obtained in Singapore to the character of the fruit used, and the manner of its cultivation. The only cultivated cucurbit to be obtained in any quantity is the cucumber, which is produced by Chinese market gardeners under conditions which are very favorable to mould—the ground where these gardens are is low, and it is the custom of the Chinese to wet down the beds three or four times a day with liquid manures. I think if wild *Momordicas* could have been obtained, the parasites would have been more abundant, but under the conditions described, the parasites have little chance to multiply.

The method used to ascertain what parasitism existed was very simple. Infested fruit was placed in cages on sand, and as soon as the maggots had emerged and pupated, the sand was screened to separate the puparia, which were then placed in shell vials.

After a few days, the flies would emerge from unparasitized material, and these were liberated daily until emergence ceased. The material was then gone over and everything discarded except the sound puparia, which would be suspected of containing parasites. When parasites emerged they were conducted as soon as possible into 6"x1" test-tubes containing a fresh leaf holding drops of honey and water. About twenty parasites can be kept in good condition in a single tube and if carefully attended they can be expected to live at least a month. If necessary to hold longer, they can be reared in confinement wherever a good supply of infested fruit can be obtained.

At Singapore I had the misfortune to lose part of my equipment and I utilized the time necessary to have it replaced in investigating melon-fly conditions in Java. It is only a 36-hour run from Singapore to Batavia, and another 3-hour journey on the railroad to Buitenzorg, the seat of Government and location of the scientific laboratories. The director of the scientific work, Dr. Konigsberger, showed sympathetic interest in my mission, and kindly offered me a desk in the Strangers' Laboratory. I spent nearly a month in Java, 10th October to 6th November, and in this time reared between 4,000 and 5,000 flies. In due course the material disclosed the parasite found at Singapore, and I was able to take a small lot of males and females away with me. My time in Java was limited, and the work done there was done too hurriedly to give anything more than an impression of the conditions, but the impression was very favorable. Cultivated fruit was scarce at that season of the year, and *Momordicas* were used very largely in rearing flies. These fruits are not cultivated in fields or gardens, but are grown by the natives around their houses, and are, therefore, very much scattered. The cultivated fields appeared clean, and I was told that two pickings are usually secured before an infestation is noticed. A large ground-beetle was very active here.

On returning to Singapore, I found a letter from Muir giving encouraging information in regard to the Philippines, but I had already made my plans to go to India, and was obliged to defer the investigation of this new field till later.

Leaving Singapore on the 9th of November, we arrived at Negapatam on the 16th, and from there I proceeded by rail to Bangalore, in Mysore State, a locality highly recommended by Compere. I may say that the idea of going to Pusa had to be abandoned on account of the low temperatures prevailing there during the winter months. I found Bangalore suited to my purposes, although it is not, as I had expected it to be, in a rich agricultural or fruit-growing section; it is one of the hill stations of India, in normal times with a garrison of more than 10,000 troops, and on account of its fine climate, has attracted many Indian pensioners. It was natural, therefore, to find on the outskirts of the city extensive gardens, and my first examina-



tion of these revealed the melon-fly. I utilized a small room in the hotel as a laboratory, and was soon rearing hundreds of flies. Before I had a chance to breed the parasites brought from Java, the same species appeared in Indian material, and in a very short time I had a flourishing colony. I spent five weeks or more in India, rearing about 10,000 flies. Out of these *Opius fletcheri* came abundantly, and I was also able to cultivate a small lot of *Spalangia*, but nothing further appeared, and after my own extensive work and the assurance of Mr. Fletcher, the Imperial Entomologist, that nothing else had ever been bred by them from *D. cucurbitae*, I decided I had exhausted this field and it was time to move on to the Philippines. All the while in India I was looking closely for *Syntemosphyrum indicum*, the fruit-fly parasite introduced by Compere into Australia, by Lounsbury into the Cape, and by Silvestri into Italy, but I saw nothing of it, and the Indian Entomologist could give me no information about it beyond what I already knew.

Leaving Bangalore on the night of 23rd December for Colombo, I was detained by the Indian police at Dhanuskodi for three days *en route*, but arrived in ample time to catch the Spanish mail 31st December, and after an uneventful voyage of 18 days reached Manila with about 75 living examples of the Indian parasite, *Opius fletcheri*, which I had carried with me on leaving India. While stopping in Singapore I had also secured infested fruit to breed the parasite *en route*, and from this material I subsequently got 64 additional individuals.

In Manila I received very generous assistance from the Bureau of Agriculture and Science, and established a laboratory in a room set aside for me at the latter institution. I found fruit very scarce and practically no cultivated cucurbits. Under the circumstances I was obliged to depend entirely for rearing and breeding purposes on *Momordicas*. These fruits are dry and do not give the same trouble with regard to mould that cucumbers do; at the same time they contain very few maggots, and are got only with great exertion and loss of time. As a consequence my stock of parasites dwindled, and I was disappointed in the hope of finding additional species. I spent nearly three months in the Philippines, rearing about 18,000 flies, but nothing new disclosed itself. This seemed strange in view of the rich fruit-fly fauna there, which is known to harbor several species of Opiine parasites. I also lost the small colony of *Spalangia*, one generation running to males.

It was unfortunate that at the time of leaving Manila, the steamer connections were such that I was obliged to remain in Hongkong a week. I used this intermission in the voyage to the best advantage, but my fruit-fly parasites had dwindled to very small proportions by the time of my arrival in Honolulu, on 10th May, 1916,

From this small stock, however, the parasite was successfully



multiplied and in the course of a month or two it was possible to liberate large lots in suitable localities. This artificial propagation has continued to the present date and thousands of the parasites have been sent out to every locality in the islands where melons are grown. By August, 1916, the parasite was recovered from fruit gathered in Honolulu gardens, and we were soon assured of the success of the introduction. At the present time the parasite accounts for the destruction of 50 per cent. of the melon-fly infesting our fruit, as ascertained from rearing parasites and flies from different localities in the islands, and in some localities it is again possible to grow melons successfully.

## Division of Forestry

Honolulu, Hawaii, February 29, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu.

Gentlemen:—I respectfully submit the following routine report of the Division of Forestry for the month of February, 1920:

### TREE PLANTING.

Weather conditions remained rather dry during the month so that this work was confined largely to the making of holes for the planting of trees later on. A few showers, however, made possible the planting of 555 red gum trees along the newly constructed fence at Kuliouou, 216 koa trees in Makiki, and 140 Japanese cedar and 350 Norfolk Island pine trees at Waiahole, making a total of 1261 trees planted during the month. To the Waiahole Nursery 2000 Australian red cedar seedlings and to the Mikilau Nursery 6000 seedlings of the same species were delivered for transplanting and holding until they are large enough to be planted out.

A shipment of 14 kauri pine seedlings, packed in moss without soil, was made by mail to Makawao, Maui, and reached the destination in excellent condition.

### FOREST FIRE.

In spite of the very dry condition of the forests, due to the lack of rainfall, only one forest fire was reported during the month. This occurred on February 12 in the Kohala Mt. Forest Reserve, Hawaii, on government land in Pololou Gulch. It was started by a small boy making a fire in the bottom of the gulch. The fire spread to the undergrowth on the west side of the gulch and traveled very rapidly towards the mountains, threatening the cane fields of the Niuli Mill and Plantation. Laborers under the direction of Manager J. A. McLennan promptly rushed to the scene and fighting the fire from 8 a. m. to 4 p. m. succeeded in extinguishing it before it had done any considerable damage.

Early in the month warnings were sent out through the medium of the press cautioning everyone to be careful and not to start any fires on account of the inflammable condition of the woods.

## WAIAHOLE EXCHANGE.

On February 13, I accompanied President Rice and Land Commissioner Bailey to Waiahole, Oahu, and pointed out to them the lands involved in the proposed exchange, which is again presented for your consideration in the form of a separate report.

## PROPOSED RULE V.

During the month I received from the Survey Office a map and description of the forested area at the heads of Palolo and Manoa valleys for use in the preparation of a new rule of this Division which will give this area greater protection. I consider the retention of the forest growth, and its preservation in a healthy condition, on these steep mountain slopes of such importance for the perpetuation of the streams and springs emanating from them, that it is necessary to do our utmost in giving the forest the greatest protection possible. A part of this region has included a favorite route for trampers who unintentionally spread Hilo grass through the region and whose trails have in some instances caused landslides. The only way to correct this and to prevent further damage of this nature is to exclude human beings from the area. It will be much cheaper to do this now rather than to try to reforest the area after the growth has been destroyed by further damage. For this purpose I have prepared Rule V forbidding trespass on this area, similar to Rule III covering upper Nuuanu Valley, and have sent advance copies for endorsement to parties who are interested in forest protection and to the Trail and Mountain Club for comment so that the rule will be thoroughly understood and appreciated before it is presented to the Board for adoption.

## MAUI TRIP.

From February 17 to 21, I was on the Island of Maui attending to several matters which I had not been able to look into sooner.

## KULA FOREST RESERVE.

This reserve was thoroughly inspected and found to be receiving better protection than ever before. Through cooperation with the Raymond Ranch, during the past summer, approximately 2.68 miles of fence have been built on the top of the ridge from Polipoli Springs to Kanahau. This has been a big factor in facilitating the driving out of the wild cattle from this reserve and in preventing new bands from crossing over from the Kahikinui side. From Kanahau to Kalepeamoa there still remains an unfenced gap of about half a mile which should be closed up to give this part of the reserve complete protection from wild stock. This the Raymond Ranch has agreed to do as soon as possible and the wire for this purpose has been ordered. From Kalepeamoa down the slope along the boundary between Kaonoulou and Waiohuli the Kaonoulou Ranch has in cooperation with this office constructed during the past year stone walls and wire fences amounting to a total length of 1.40 miles so that cattle can not now get into the reserve from this side. With the above fencing completed it will then be possible to proceed with the reforestation of the area.

The old fence near Polipoli Springs is in need of repair and the Land Commissioner has been called upon to require the holder of Land License No. 542 to attend to this so that tame cattle from the Kula pastures will no longer trespass on the reserve. Owners of stock in this region have been reminded of Rule II of this Division and have been warned not to allow their stock to graze on the reserve.

### HAIKU NURSERY.

The new nursery of the Division at Haiku, Maui, was inspected and found to be in good running order. Under the supervision of Ranger James Lindsay a good stock of trees has been grown and this nursery is now prepared to supply the demand for trees on the Island of Maui.

### ALGAROA THINNINGS.

Part of a day was spent in the algaroba forests near Kihei at the request of the Land Commissioner advising the holder of an algaroba bean gathering license as to the proper method of thinning out the algaroba trees and disposing of the tops and tangle of brush so as to increase the bean production and facilitate their gathering.

Respectfully submitted,

C. S. JUDD,  
Superintendent of Forestry.

### REPORT OF FOREST NURSERYMAN.

Honolulu, Hawaii, March 4, 1920.

Superintendent of Forestry, Honolulu, T. H.

Sir:—I herewith submit a report of the work done during the month of February.

### NURSERY.

#### Distribution of Plants—

	In Seed Boxes.	In Trans- plant Boxes.	Pot Grown.	Total.
Sold . . . . .	100	100	85	185
Gratis, including forest reserves..	8,100	480	234	8,814
Total . . . . .	<u>8,100</u>	<u>580</u>	<u>319</u>	<u>8,999</u>

### COLLECTIONS.

#### Government Realizations—

Collections on account of plants sold.....	\$ 1.85
Rent of Office, Nursery Grounds, for January.....	35.00
Total . . . . .	<u>\$36.85</u>

### PLANTATION COMPANIES AND CORPORATIONS.

Under this heading 55,200 trees in seed boxes were distributed.

### MAKIKI STATION.

At this station the work has been principally routine, consisting of mixing and sterilizing soil, transplanting trees into pots and boxes, etc.

## HONOLULU WATERSHED PLANTING.

Trees planted in Opu Valley amounted to 216 koa trees. Preparations are being made for the planting of koa trees on the open land adjoining the Schmidt estate on Diamond Head side. The road runs through this land and it is a choice place for planting trees.

## ADVICE AND ASSISTANCE.

The writer has been called upon to make the following number of visits and otherwise give advice and assistance:

Calls made .....	8
Advice to people calling .....	10
“ by telephone .....	6

## HAWAII NURSERY AT HILO.

Brother Matthias Newell, in charge of the nursery for the Island of Hawaii, at Hilo, reports that the distribution of plants from his nursery for the calendar year 1919 amounted to a total of 12,303.

## KAUAI NURSERY AT KALAHEO.

The nursery for the Island of Kauai is located at Kalaheo and is in charge of Joe Rita, Jr. Mr. Rita reports that he distributed a total of 3,602 trees from his nursery during 1919, as follows:

Sold . . . . .	1,420
Gratis . . . . .	661
Papapaholahola Spring Reserve .....	1,521
	<hr/>
	3,602
	<hr/>

The report of the number of trees distributed during 1919 from the nursery for the Island of Maui, located at Haiku, will appear in the next monthly report, as it has not yet arrived.

The distribution of trees from this nursery during 1919 will also appear in our next report.

Respectfully submitted,

DAVID HAUGHS,  
Forest Nurseryman.

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## Division of Entomology

Honolulu, Hawaii, March 5, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—During the month of February the insectary handled 19,700 pupae of the melon fly, from which there were bred 3,657 females and 2,480 males, *Opius fletcheri*.

The distribution of parasites was as follows:



## MELON FLY PARASITE.

*Opius fletcheri.*

Oahu:	Females.	Males..
Cucumber Field, Kalakaua Avenue.....	200	200
Cucumber Field, Moanalua .....	635	365
Keaau, Waianae .....	680	680
Niu .....	680	480
Waikiki .....	100	100
Molokai:		
Kamalo .....	200	200

## FRUIT FLY PARASITES.

*Diachasma tryoni.*

Oahu:		
Waikiki .....	185	185
Kalihi .....	50	50
Piikoi Street .....	60	60
Nuuanu .....	200	200

*Diachasma fullawayi.*

Oahu:		
Waikiki .....	30	30
Nuuanu .....	70	70
Kalihi .....	50	50

*Tetrastichus giffardianus.*

Oahu:		
Waikiki .....		500
Nuuanu .....		400
Kalihi .....		300

*Dirhinus giffardi.*

Oahu:		
Nuuanu .....		400

*Opius humilis.*

Oahu:		
Nuuanu .....	80	80
Waikiki .....	50	50

## CORN LEAF HOPPER PARASITE.

*Paranagrus osborni.*

Oahu:		
Kaneohe .....		2,800

Respectfully submitted,

D. T. FULLAWAY,  
Entomologist.

## Division of Plant Inspection

Honolulu, Hawaii, February 29, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—I respectfully submit my report of the work carried on by the Division of Plant Inspection for the month of February, 1920, as follows:

During the month 63 vessels arrived at the Port of Honolulu, 22 of which carried vegetable matter and 12 vessels came through the Panama Canal Zone. The following disposal was made of the various shipments:

Passed as free from pests.....	823 lots	17,436 pkgs.
Burned.....	67 "	67 "
Fumigated.....	8 "	9 "
Returned.....	2 "	261 "
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Total Inspected.....	900 "	17,773 "

Of these shipments 17,457 packages arrived as freight, 184 packages as mail and 132 packages as baggage.

### RICE AND BEAN SHIPMENTS.

During the month 23,035 bags of rice from Japan, 200 mats of rice from China and 2,107 bags of beans from Japan arrived and were found free from pests.

### PESTS INTERCEPTED.

Approximately 3,940 pieces of baggage belonging to immigrants from foreign countries were examined from which 32 lots of fruit and 22 lots of vegetables were seized and destroyed.

On February 4 a package of rice paddy found in the baggage of a passenger from China was seized and destroyed. A package of seeds for Professor Rock from Egypt was fumigated on account of weevils.

On February 5, per Shinyo Maru, a package of corn found in the baggage of an immigrant from Japan was seized and destroyed under quarantine Notice No. 24 of the Federal Horticultural Board. A package of rice paddy in the mail from Japan was also seized under Quarantine Notice No. 39. A package of pili nuts and a package of seeds, both from Manila, were found in the mail and fumigated as a precautionary measure.

On February 8, per Kiyo Maru, a package of grass seed in the mail from Japan was fumigated as a precaution.

On February 11, per Siberia Maru, a package of chestnuts found in the baggage of an immigrant from Korea and a plant in the baggage of an immigrant from Japan were both seized and destroyed, one being weevily and the other prohibited. A package of rice paddy and a package of corn in the mail from Manila, as well as a package of fruit in the mail from Japan, were seized and destroyed.

On February 17, per Maui from San Francisco, a consignment consisting of 260 bags of potatoes for L. Ah Leong from Jacobs, Malcolm & Burt, was found badly infested with potato scab and ordered returned to the shipper. A package of corn in the baggage of an immigrant from Manila per Colombia was seized and destroyed.

On February 23, per Persia Maru, a package of vegetable seeds from Japan and 2 tins of tree seeds from Java for the H. S. P. A. were

found in the mail and fumigated as a precaution; 2 packages of paddy rice from Japan were seized and destroyed.

On February 26, per Shinyo Maru from San Francisco, 2 cases of oranges badly infested with scale insects, were taken from a passenger and fumigated with HCN.

On February 27, 3 packages of paddy rice in the mail from Manila by the Santa Cruz, were seized and destroyed.

#### HILO INSPECTION.

Brother M. Newell, Inspector at Hilo, reports the arrival of six vessels at the Port of Hilo. Four carried vegetable matter consisting of 74 lots and 1,436 parcels. These were all found free from insect pests excepting one lot of turnips, the leaves of which were infested with aphids. After removing same and destroying them, the turnips were passed. Two thousand eight hundred and eighty-three bags of rice and 110 bags of beans arrived per Kiyō Maru from Japan and were passed.

#### KAHULUI INSPECTION.

Mr. Will J. Cooper, Inspector at Kahului, reports the arrival of eight vessels at the Port of Kahului. Two of these, the Manoa and the Lurline, carried vegetable matter consisting of 12 consignments and 719 parcels, all passed as free from pests and plant diseases.

#### INTER-ISLAND INSPECTION.

Fifty-five steamers plying between Honolulu and the other island ports were attended and the following shipments passed as free from infestation:

Taro.....	517 bags
Vegetables.....	328 pkgs.
Fruit.....	187 "
Plants.....	91 "
Seeds.....	20 "
Pineapple shoots.....	825 bags
Sugar cane.....	19 cases
Total passed.....	1,987 pkgs.

Six packages of plants and ferns and three cases of vegetables were refused shipment on account of infestation, undesirable soil and not complying with the regulations.

Respectfully submitted,

E. M. EHRHORN,  
Chief Plant Inspector.

## Division of Animal Industry

Honolulu, Hawaii, February 29, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu.

Gentlemen:—I beg to submit the following report of the work of the Division of Animal Industry for the month of February, 1920:

## SALT POISONING IN HOGS.

On the 4th instant, an outbreak of an acute disease among the hogs in a large piggery at Kuliouou was reported to this office. On arrival it was found that one sow had died and that three more were very ill, being partly paralyzed, trembling all over and frothing at the mouth. Post-mortem examination failed to show any of the usual symptoms of either hog cholera or swine plague. Only a hemorrhagic condition of the stomach and inflammation of the small intestine were observed. The symptoms were as those of salt poisoning, which diagnosis was borne out by the owner's statement to the effect that he had, a few days before, obtained a dead horse which he had cut up and salted down for future use as he had at the time plenty of feed on hand. In feeding this meat to the hogs, he had failed to wash it out sufficiently, not knowing that salt constitutes a strong poison for hogs.

A similar case was observed some years ago at Puuloa where a considerable number of hogs were lost, and it would be well for hog owners to take note of this fact and to remember to soak all such salted meat well before feeding it to these animals.

The treatment of the sick hogs consisted in placing them in a creek with fresh running water in order to make them drink as freely as possible. If laxatives are given, oil should be used in preference to salts. The three sick hogs recovered.

## HEMORRHAGIC SEPTICEMIA ON MAUI.

On the 14th instant, Dr. Fitzgerald reported an outbreak of hemorrhagic septicemia in the Makawao district. Only one animal had died and the remaining ones were segregated and vaccinated. No further deaths occurred.

The hemorrhagic septicemia vaccine, which was ordered by wireless for the treatment of the outbreak reported last month from the same district, was received on the 9th instant, and immediately forwarded to Maui and applied to the purebred herd above referred to. No more cases have occurred in this herd either.

## INFECTIOUS ABORTION IN CATTLE.

I regret to report that this disease seems finally to have made its appearance in the islands. Two cases were reported in the largest purebred Holstein herd in Honolulu, both resulting in death on account of complication with hemorrhagic septicemia. As this disease is caused by a specific micro-organism, various scientists have succeeded in making an effective vaccine for its prevention and treatment. A cable was consequently sent without delay for a sufficient amount of the vaccine to treat this and other herds, in case the disease should show any inclination to spread. This vaccine has now been received and will be applied in the course of a few days.

## IMPORTATION WITHOUT PERMIT.

On the 5th instant, the U. S. A. T. Logan arrived here with one dog which the owner declared he had smuggled on board and had intended to remove in the same manner if its presence had not been discovered. The case has been referred to the Attorney General for action.

Respectfully submitted,

VICTOR A. NORGAARD,  
Territorial Veterinarian.



## REPORT OF ASSISTANT VETERINARIAN.

Dr. Victor A. Norgaard, Chief, Division of Animal Industry,  
Bureau of Agriculture and Forestry, Honolulu.

Sir:—I have the honor to submit the following routine report for the month of February, 1920:

## TUBERCULOSIS CONTROL.

The following cattle were tested during the past month:

	Tested.	Passed.	Con. demned.
C. S. Judd .....	2	2	0
C. H. Bellina .....	57	57	0
C. W. Lucas .....	28	28	0
Waialae Ranch .....	386	375	9
Chas. Lucas . . . . .	136	136	0
Chas. Lucas . . . . .	12	11	(1 suspect)

A total of 621 head of cattle were given the intrapalpebral tuberculin test out of which number 611 were passed as free from tuberculosis, 9 were condemned and branded and 1 held in quarantine as a suspect.

## CONTAGIOUS EPITHELIOMA.

Forty chickens were injected with vaccine during the month for this poultry disease.

## IMPORTATIONS OF LIVE STOCK.

A total of 50 vessels were boarded at the Port of Honolulu, of which the following were found to carry live stock for this Territory:

S. S. Matsonia, San Francisco—1 crate chickens, American Ry. X. Co.  
S. S. Sachem, San Francisco—1 Berkshire boar, Alexander & Baldwin (Kam. School); 28 crates poultry.

S. S. Manoa, San Francisco—2 cats, C. A. Reynolds; 1 dog, Mrs. R. P. Howell; 2 crates rabbits, American Ry. X. Co.; 43 crates poultry, various; 1 caged lion, Carter Co.; 1 cage of monkeys, Shriners' Happyland.

U. S. A. T. Logan, San Francisco—1 dog, Lieut. James G. Bishop.

S. S. Lurline, San Francisco—12 Holstein cows, 1 calf, Chas. Lucas; 2 horses, U. S. Army; 8 crates poultry.

Respectfully submitted,

LEONARD N. CASE,  
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# THE HAWAIIAN FORESTER AND AGRICULTURIST

MAY, 1920

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Trees for planting on Windward Kauai may be obtained from the Kapaa School by applying to Mr. Geo. S. Raymond, Principal.

HONOLULU, OAHU. Government Nursery, King Street, in charge of Forest Nurseryman David Haughs, Box 207, Honolulu. Fresh tree seed may also be obtained from this nursery.

HAIKU, MAUI. Nursery in charge of Forest Ranger James Lindsay, Haiku.

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C. S. JUDD,  
Superintendent of Forestry.

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To give information about insects free of charge is one of the duties of this Division, and Hawaiian readers are hereby invited to make inquiry in person and by mail. In order to be able to advise intelligently or send the right kind of useful insects for relief, we like and sometimes it is indispensable for us to see the insects suspected or caught in the act, also specimens of the injury. In a tin with a hole or two, or a wooden box, specimens may be mailed by parcels post. When specimens are not accompanied by letter, always write your name and address in the upper left-hand corner of the package. Address all communications, DIVISION OF ENTOMOLOGY, P. O. BOX 207, HONOLULU, HAWAII.

D. T. FULLAWAY,  
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Applications for publications should be addressed to the Mailing Clerk, P. O. Box 207, Honolulu, Hawaii.

# THE HAWAIIAN FORESTER AND AGRICULTURIST

VOL. XVII.

HONOLULU, MAY, 1920.

No. 5

## Change in Presidency

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GARDEN

Captain A. L. C. Atkinson was on May 7, 1920, appointed by Governor McCarthy as President of the Board of Commissioners of Agriculture and Forestry in the place of Mr. A. H. Rice, who on May 4 resigned from the presidency on account of the increased demands on his time in his private business. Mr. Rice, however, remains a commissioner on the Board.

Captain Atkinson is well fitted for the position from his long experience and familiarity with Territorial work.

The annual reports of the four divisions of the Board—Forestry, Entomology, Plant Inspection and Animal Industry—for the calendar year 1919 appear in this issue and indicate the progress that has been made along the various lines of activity.

Attention is called to the article on the Makiki Nursery appearing in this issue and to the fact that visitors to this nursery are always welcome.

Six thousand packages of vegetable seed have been received at the Government Nursery from our Delegate to Congress, Hon. J. K. Kalanianaʻole, and are now available for distribution by mail or in person to those who desire and can make good use of them. Applications for the seed should be sent to Mr. David Haugs, P. O. Box 207, Honolulu.

A virulent form of hemorrhagic septicemia broke out in cattle at Naalehu, Kau, Hawaii, early in May with so far 80 deaths from the disease. The Territorial Veterinarian is busily engaged in vaccinating the herds in that region to prevent further losses.

How well the scenic beauties of these islands compare with the attractive features in the national parks on the mainland was pointed out by Mr. H. M. Albright, Field Assistant to the Director of the National Park Service, who is familiar with all of the

JUN 29 1920

U. S. national parks. After his recent visit to the Territory in late March and early April Mr. Albright was very much delighted with the Haleakala and Mauna Loa sections of the Hawaii National Park and stated that the Kilauea section equalled, if not surpassed, any feature in any of the numerous national parks.

---

## The Makiki Nursery

---

By C. S. JUDD, *Superintendent of Forestry.*

Those who are interested in horticulture would no doubt find quite instructive and well worth while a visit to the nursery of the Board of Agriculture and Forestry in Makiki Valley, Honolulu. Here not only are young trees propagated and raised for distribution, which involves the sowing of seed and transplanting of seedlings, the making of boxes, cutting of tins, and sterilization of the soil, but also corn and cabbages are raised to supply material on which natural enemies of insect pests of these two plants are propagated by the entomologist.

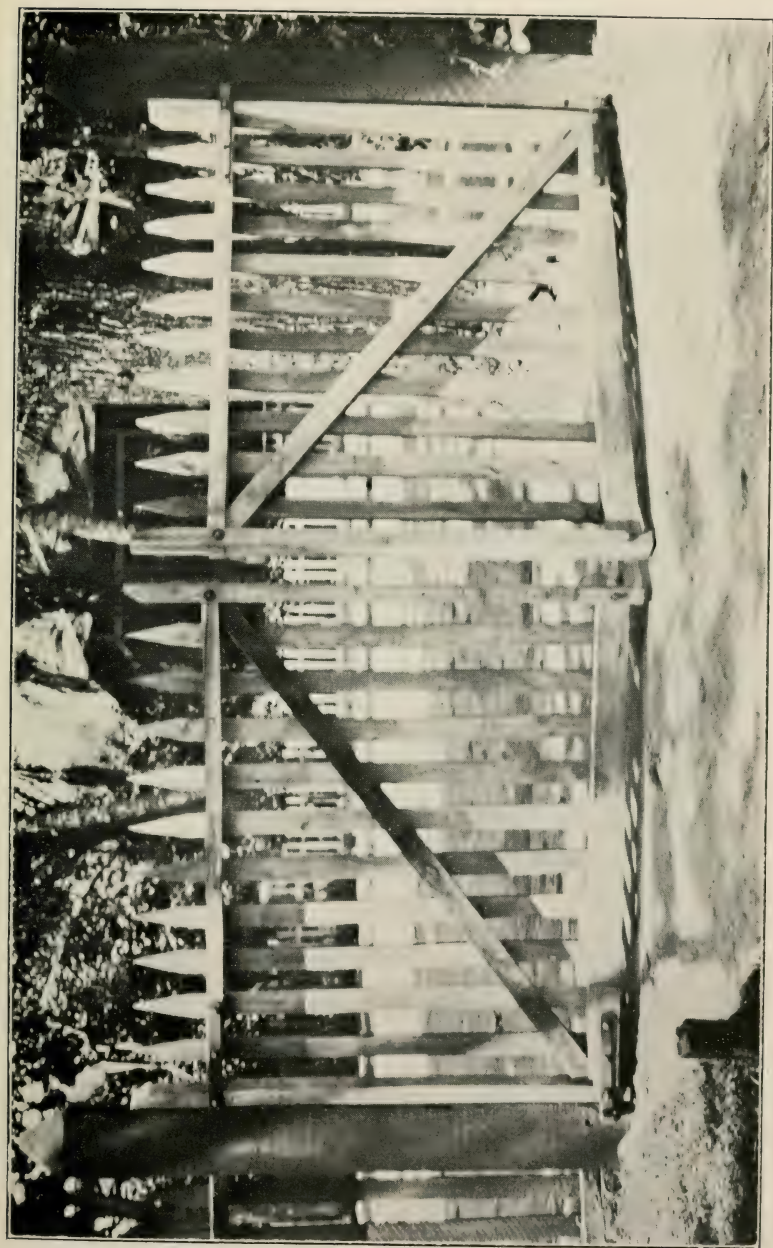
As a rule the seed is sown in boxes in special propagating houses at the Government Nursery on King street and then taken up to the Makiki Nursery where the young seedlings are transplanted into tins or pots or into boxes.

All of the soil used in these operations is carefully prepared, it consisting of one-third sifted, sharp, volcanic sand, one-third good soil, and one-third well rotted manure. The sand affords good drainage and keeps the soil light. The mixture is screened and then sterilized by placing it in a tight box through which run steam pipes which generate a heat great enough to kill all insect life and the seeds of all weeds. This is a great advantage not only in the saving of weeding labor, but better results are secured in the seedlings which do not have to compete with weed growth and insects.

The tins into which the seedlings are transplanted are of various size and are rejects secured free of charge from local pineapple canneries. The bottoms are cut around on a specially devised cutter invented by the Forest Nurseryman, Mr. David Haughs, who during his long years of experience has invented many other labor-saving devices, such as a planting board, and is able to raise seedlings from good seed with 100 per cent. success.

The wood for the boxes into which seedlings are also transplanted was formerly imported entirely in the form of shooks from the Pacific Coast, but with the increased cost of lumber it has been found cheaper to buy up old packing boxes and remake them into trays of the standard size. Locally grown wood, such as the Norfolk Island pine and silk oak, from trees that have had





Gate at Government Nursery Made of Locally Grown Silk Oak Wood.



to be removed from yards, have been sawed up at the nursery sawmill and made into very serviceable boxes.

In this manner, tree seedlings amounting to an annual average of over 350,000 during the past seven years, have been propagated and distributed throughout the Territory. Since June 1, 1919, when the rule prohibiting the shipment of trees in soil to other islands went into effect, the output of the Makiki Nursery has not been so great, but the capacities of the nurseries of the Board on the other islands have been increased to meet the demand for trees.

The Skinner system of irrigation has lately been installed at the Makiki Nursery. This consists of three horizontal pipes, running across the nursery above ground, from which the water emanates in small jets and falls on the plants in much the same form as rain. The installation of this automatic system has saved the time of one man who formerly had to water the plants with a hand hose.

The main output of this nursery consists of the well known trees which are in common demand and which have proved to be good growers. Among these are the three common eucalyptus--the blue gum, lemon-scented gum and swamp mahogany; the ironwood, pepper, Christmas berry; the pink, pink and white, and golden showers; yellow and royal poincianas, jacaranda, monkey-pod, silk oak, Monterey and Arizona cypresses, Japanese cedar, St. Thomas tree and pride of India. Lately there has also been a supply of Norfolk island pine and kauri pine seedlings available.

Among the indigenous trees distributed are the koa, wiliwili and milo. In limited quantities there are now available for distribution seedlings of the Tahitian kou, Tahitian kamani, the native halapepe and sumach, Australian red cedar, papaia, lime and orange, alligator pear, macadamia nut, St. John's bread or Egyptian locust, several species of the genus *figus*, and a variety of palms. Of special interest now on hand is a quantity of seedlings of the all-spice, an ornamental tree with very fragrant, spicy leaves.

A large quantity of vines, such as the Mexican creeper, the fast-growing *ipomea* with yellow blossoms, and Mauritius ivy, is grown and these are in the greatest demand on the army posts where it is desired to secure a quick-growing screen to buildings.

On the nursery grounds there are set out many varieties of hibiscus and oleander from which selections for cutting may be made. A large panax hedge also supplies cuttings for this most popular hedge plant.

A plot of Arizona cypress, juniper and Japanese cedar trees, in a small valley back of the nursery, supplies Christmas trees and decoration greens.

One section of the nursery is devoted to several varieties of basket willows to furnish cuttings of this plant, the product of which deserves greater attention as a possible minor industry in

this Territory. Of the other shrubs, a supply of crepe myrtle, ixora, cannas, and bamboos is kept on hand.

These trees, shrubs and vines are available to all at cost and no charge is made when they are planted for public purposes.

The same boiler which generates steam for the soil sterilizer runs the small steam engine which operates the sawmill. In this mill it is possible to cut up logs for posts and other sizes of lumber required in the nursery work. One of the products constructed from silk oak lumber turned out on this sawmill is shown in the accompanying illustration.

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## The Fire Menace

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Owing to the protracted dry spell and lack of rain which has made the native forests on Oahu very dry and inflammable, the Chief Fire Warden of the Territory has deemed it necessary to prohibit, as provided by law, the starting of fires to clear land except by permit from the fire wardens. His official notice appears on the By Authority pages in this issue.

No permits to start fires will be issued where there is the least danger that the fire will spread to adjacent inflammable material and none of such fires are to be started when there is a high or dangerous wind blowing.

This prohibition applies to the whole island of Oahu.

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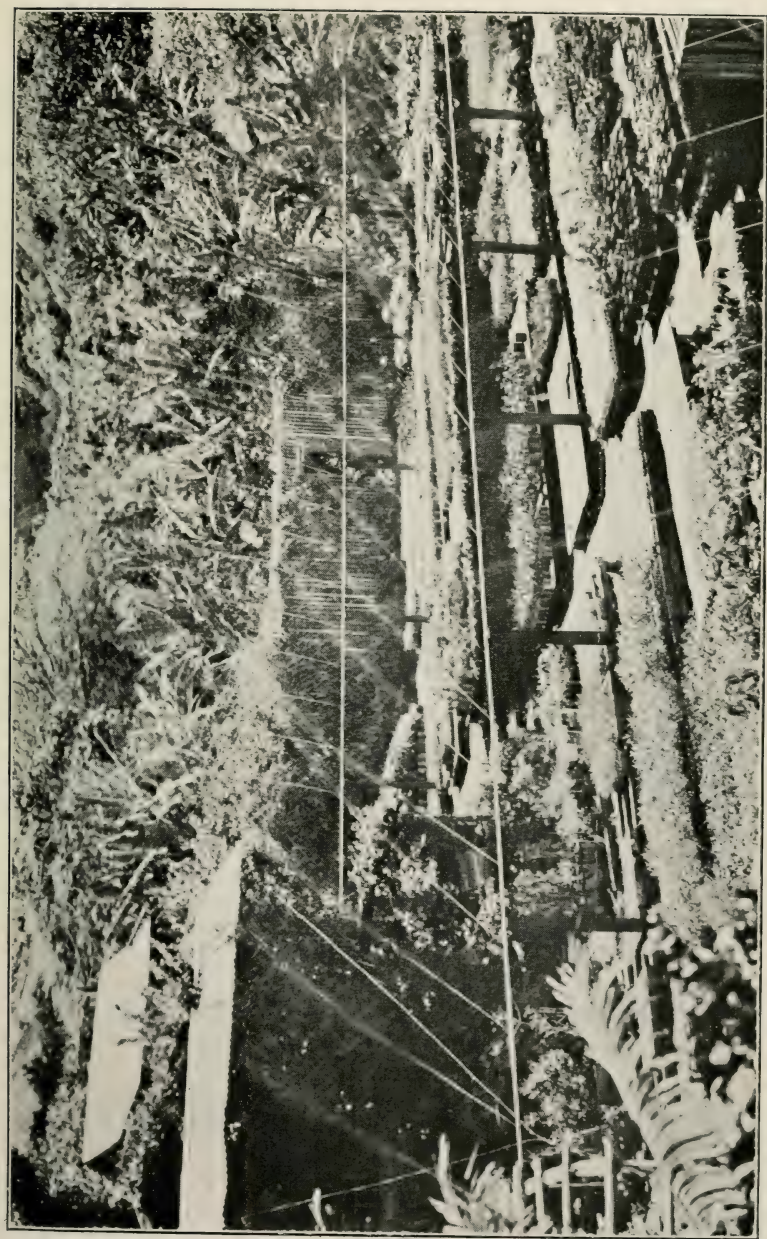
## Quarantine Justified

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Under date of April 8, the "Breeders' Gazette" publishes the following over the initials W. N. L.:

"Kedron, General Pershing's war horse, recently was released from quarantine at Newport News, Va., by the Department of Agriculture. It will be remembered that efforts were made to have him released immediately after his arrival in order that Gen. Pershing might ride him in the triumphal parades in New York and Washington. The department took the position, however, that the menace to the live stock interests of the country was such that the release of even so distinguished an animal as Kedron could not be justified. While Kedron came through as sound as on the day of his departure for France, the wisdom of the quarantine has been established by the fact that other officers' mounts in quarantine at Newport News did develop dangerous diseases and two of them had to be destroyed. One of these had a contagious disease not known to exist in this country. The other had trypanosomiasis, an infectious blood disease, akin to





Makiki Nursery Showing Skimmer System of Irrigation.



dourine, that is more or less prevalent in northern Africa and southern Europe. If the quarantine had not been established and these horses had been allowed to go free in the United States they probably would have been the means of spreading the diseases to such an extent that it would have been necessary to spend many thousands of dollars to eradicate the maladies, if they could have been eradicated at all."

---

## Plant Inspection Rule Amended

---

The Board of Commissioners of Agriculture and Forestry, at a regular meeting held on May 4, 1920, voted to amend the new Rule XXI of the Division of Plant Inspection concerning the control of certain insect pests and plant pests in the Territory so as to allow the shipment inter-island and between localities on the same island of commercial ginger root. Since the ginger weevil has so far been found only on the root of the white ginger (*Hedychium coronarium*), it was decided to confine the prohibition to this part of this plant.

The amended rule, which was approved by the Governor on May 7, 1920, appears on the By Authority pages of this issue.

---

## Divisional Annual Reports

---

### DIVISION OF FORESTRY.

Honolulu, April 1, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu.

GENTLEMEN:—I have the honor to submit the following brief report covering the work of the Division of Forestry for the calendar year, 1919:

#### INTRODUCTION.

Considerable progress has been made during the year along the two main lines of work, forest protection and forest extension. With the work of setting aside new reserves completed and out of the way, it has been possible to give greater attention to the protection and reforestation of the established reserves. The present total area now in the 47 forest reserves, after the elimination on April 2, 1919, of 415 acres on Kauai for the Puu Ka Pele Park, amounts to 818,739 acres. Of this, 558,655 acres or 68% is government land.

A force of nine forest rangers is now employed on the four main islands who look out for the special needs of forestry in their respective districts, as well as the interests of forest protection in general.

#### FOREST PROTECTION.

By regular appropriation the work of fencing forest boundaries has progressed as much as the present high cost of material would justify and this has been augmented by cooperation with private owners and by requirements in general leases. In this manner a total of 7.79 miles of reserve boundaries have been newly fenced and 3.38 miles of fencing repaired, making a total of 11.27 miles receiving added protection as shown by the following table:

#### NEW FENCES IN 1919.

<i>Completed.</i>	<i>Island.</i>	<i>Reserve</i>	<i>Length in Miles.</i>
February....	Hawaii.....	Kau.....	1.00
March.....	Oahu.....	Makua.....	.84
March.....	Oahu.....	Makua.....	1.07
June.....	Hawaii.....	Kohala Mt.....	.13
July.....	Hawaii.....	Olaa Forest Park....	.30
August.....	Hawaii.....	Olaa Forest Park....	.19
September..	Maui.....	Kula.....	2.68
October.....	Hawaii.....	Olaa Forest Park....	.28
December...	Maui.....	Kula.....	1.40
			<hr/> 7.89 <hr/>

#### FENCES REPAIRED IN 1919.

February....	Kauai.....	Moloaa.....	3.00
October.....	Kauai.....	Papapaholahola.....	.38
			<hr/> 3.38 <hr/>
Grand Total .....			<hr/> 11.27 <hr/>

#### RIDDANCE OF WILD STOCK.

In addition to the driving out of wandering tame cattle from the reserves the following wild stock was killed within the forest reserves during the year: Goats 304, pigs 266, cattle 42, making a total of 612 head. This does not represent the total number thus eliminated from the forest reserves because the reports submitted are by no means complete. It is realized that this feature of pro-



tection is as important as fencing and permission to hunt is encouraged where damage to the forest will not result.

#### FOREST FIRES.

Owing to a very dry year there have been more fires than usual but fortunately none of them did any considerable or extensive damage to native forest growth. The following fires were reported:

*February 27.* Ohoikea Section of Kapapala Ranch, Kau, Hawaii. Fire burned over 1,500 acres of mostly grass land, but was extinguished same day by ranch cowboys and laborers from Pahala Plantation under Fire Warden James Campsie.

*February 29.* Wailau, at edge of Kau Forest Reserve, Kau, Hawaii. Fire of unknown origin burned 40 acres of forest land with considerable damage to undergrowth and a quantity of ohia trees. Men under Fire Wardens George Gibb and James Campsie soon extinguished it.

*May 6.* Pupukea Forest Reserve, Oahu. During some pineapple clearing a fire jumped the fire guard and burned over 40 acres of grass, damaging a few clumps of trees. Laborers working under Fire Warden F. S. Lyman extinguished it that night.

*July 6.* Lihue, Honouliuli, Oahu. A bee hive robber set fire to the grass with his smoking torch. The fire spread over 75 acres of grass land with practically no damage to trees. It was extinguished the same day by soldiers and pineapple laborers under Mr. A. W. Eames and Fire Warden A. A. Wilson.

*July 6.* A fire started on this day presumably by pig hunters burned over about 5,500 acres of pasture land in Kaohe and Kaholalele on the slopes of Mauna Kea, Hamakua, Hawaii, at an elevation of 5,000 to 7,000 feet, for a period of approximately two months before it was extinguished by rains.

*August.* During this month two small fires less than one acre in extent were extinguished at once by Forest Ranger Hardy in the Na Pali-Kona Forest Reserve, Kauai.

*October 1.* A grass fire on the ridge in Nuuanu Valley adjacent to the Country Club, started by brush burners, swept over an area of 20 acres of grass and brush land on the slope, but was extinguished in three hours by the fire department and men working under the Deputy Fire Warden at Large.

*November 29.* Wainiha, Kauai. A fire started along the ditch trail burned over a few acres of staghorn fern, but was soon extinguished.

#### FOREST EXTENSION.

##### *Tree Nurseries.*

This Division now maintains eight forest nurseries on the four main islands. Five of these are for the propagation of trees for

tree planting on forest reserves, while the other three are for general distribution and supplying the needs for tree planting on forest reserves, while the other three are for special reserve planting projects. In addition to these, arrangements have been perfected with the principal of the Kapaa School on Kauai whereby he will raise trees for general distribution to the children of the numerous homesteaders in that region.

On account of the new rule forbidding the shipping of trees in soil to prevent the spread of insect pests, provisions were made for supplying each of the main islands with trees from local nurseries. The existing nurseries on the other islands were somewhat enlarged and a new nursery, started at Haiku in April, was in good running order by fall and ready to supply the needs of Maui for trees.

Following is a list of the present tree nurseries:

*Nurseries for General Tree Distribution.*

*Kauai*, at Kalaheo in charge of Joe Rita.

*Oahu*, at Government Nursery, King street, and in Makiki Valley. Honolulu, in charge of Forest Nurseryman David Haughs.

*Maui*, at Haiku, in charge of Forest Ranger James Lindsay.

*Hawaii*, at Hilo, in charge of Bro. Matthias Newell.

*Mountain Nurseries.*

*Oahu*, Sugar Loaf, Mikilua, and Waiahole.

TREE DISTRIBUTION.

The number of trees distributed from the main nurseries during the past year was as follows:

*Trees Distributed from Nurseries in 1919.*

	Seedlings.	Trans-plants.	Pot Grown.	Total.
Oahu—				
Sold . . . . .	1,000	450	1,732	3,182
Gratis				
Arbor Day . . . . .			6,392	6,392
Forest Reserves . . . . .	17,900	3,260	6,031	27,191
Homesteaders . . . . .	3,000	1,300	4	4,304
Military Posts . . . . .	19,200	5,913	2,093	27,206
Parks . . . . .			52	52
Schools . . . . .			80	80
Street Planting . . . . .			949	949
Miscellaneous . . . . .	24,000	9,000	3,084	36,084
Plantation Companies, etc. . . . .	103,000	16,300	10,936	130,236

Kauai . . . . .	.....	3,602	3,602
Maui . . . . .	40,500	.....	40,500
Hawaii . . . . .	.....	6,303	6,000
			12,303
Totals . . . . .	208,600	42,526	40,955
			292,081

#### TREE PLANTING ON FOREST RESERVES.

During the year tree planting operations on forest reserves in need of reforestation have been extended. The planting of koa trees for watershed cover has been continued in the Makiki Valleys back of Honolulu and the planting of koa and other species for cover and protection has been continued in the Lualualei Forest Reserve at Mikilia. New planting projects were started at Keaau and Waiahole on Oahu. Planting on the Kealia Reserve and at Papapaholahola Spring, on Kauai, has also continued during the year. In this manner in spite of a comparatively dry year the following trees, totaling 32,648, were planted out on government lands on these two islands:

#### *Trees Planted in Forest Reserves in 1919.*

Koa . . . . .	8,532
Red gum . . . . .	6,482
Yellow poinciana . . . . .	4,737
Ironwood . . . . .	3,537
Bloodwood . . . . .	2,212
Swamp mahogany . . . . .	1,844
Silk oak . . . . .	1,842
Monkey-pod . . . . .	1,292
Mahogany . . . . .	570
Miscellaneous . . . . .	504
Logwood . . . . .	496
Molave . . . . .	330
Wiliwili . . . . .	170
Blackwood . . . . .	100
Total . . . . .	32,648

The miscellaneous species consisted of the red sandalwood, wood oil tree, camphor, *Brassaia*, kassod, and sappan, which were set out in small quantities to test their adaptability to certain regions.

#### GENERAL TREE PLANTING.

Reports received from tree planters throughout the Territory which are not as yet complete show that during the year a total of 634,823 trees were planted on the several main islands, includ-

ing the reforestation projects of this Division. The plantings were distributed as follows:

Kauai . . . . .	76,135
Oahu . . . . .	171,439
Maui . . . . .	319,103
Hawaii . . . . .	68,146

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Total number of trees planted. . . . 634,823

This is somewhat less than during the previous year, but can be accounted for by the very dry season which made planting inadvisable in many localities and by the increased cost of labor.

#### MISCELLANEOUS.

In addition to the two main lines of work described above this Division has rendered service to the community in other but related directions.

#### EDUCATION.

Besides giving advice on tree planting and the care of trees, which subject has largely been handled by the Forest Nurseryman, who has also cooperated with the Superintendent of Forestry in giving instructions and demonstrations on the same subject at the vocational school for soldiers at Schofield Barracks, the Superintendent gave a course of 12 lectures on elementary forestry and the Hawaiian forests at the Territorial summer school during August and later in the fall three lectures on forestry in Hawaii in the short course for plantation men at the College of Hawaii.

The working erosion model operated again at the Territorial Fair in June to illustrate the beneficial effects of a forest cover excited more than usual interest and favorable comment.

In addition to articles on forestry and specially described trees which appeared in the official monthly magazine of this Board, the Division published two new Botanical Bulletins by Consulting Botanist J. F. Rock: No. 5, "The Arborescent Indigenous Legumes of Hawaii," and No. 6, "The Hawaiian Genus *Kokia*."

Respectfully submitted,

C. S. JUDD,  
Superintendent of Forestry.



## DIVISION OF ENTOMOLOGY.

Honolulu, April 15, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu.

GENTLEMEN :—I submit herewith, in compliance with the law, a brief report of the activities of the Division of Entomology in the annual period January 1st to December 31st, 1919.

The propagation and distribution of beneficial insects, particularly the fruit fly, horn fly and corn leaf hopper parasites, has been continued throughout the year and a tabulation below gives the number liberated.

No new field work has been undertaken, on account of the unsettled conditions abroad and poor transportation facilities, but through the cooperation of the California State Horticultural Commission a pupal parasite of one of the destructive cabbage insects (*Pieris rapae*—cabbage worm, imported cabbage butterfly) was received by mail from California, and has been propagated in our insectary, from which large colonies have been liberated in cabbage fields on Oahu and Hawaii. The establishment of the insect has not yet been determined.

Considerable time has been given to the study of the termites or white ants, which are becoming severely and alarmingly destructive with the increase and spread of two lately immigrant species.

An investigation was begun during the summer on the natural control of the dungflies in Hawaii with the purpose in mind of securing additional agents, if conditions warranted it, and so improving the control. These investigations remain incomplete, more urgent matters necessitating their suspension temporarily.

In September an infestation of the forest ferns by the Australian weevil *Syagrius fulvitarsis* was discovered at 29 Miles from Hilo on the Hilo-Kau road. On account of the wealth of fern growth in this region and the importance of the ferns as part of the ground cover in the Hamakua forest reserve, it was decided to attempt to control the outbreak and prevent the spread of the weevil beyond the confines of the small area in which it was determined to be present. This necessitated the destruction of all ferns in the area as far as possible, which were cut and burned; thereafter, the ground cover was either fired or poisoned as far as possible to destroy crawling weevils, which might have escaped the initial treatment, and every vestige of fern plant on which the beetle could subsist; and an artificial barrier of crude oil was laid to contain the insect. At the same time an investigation was made of the weevil's history, habits, cyclical development, etc., which had not previously been done, although the weevil has been known in the islands fifteen years. This work has occupied the division almost exclusively during the re-

mainder of the year. The routine work of advising in regard to agricultural and stock pests, maintenance of collections, etc., however, has been adequately attended to.

A list of the publications of the Entomologist during the annual period follows:

1. Description of *Paranagrus osborni*, n. sp. (Hymenoptera, Mymaridae). Proc. Haw. Ent. Soc., v. 4 (1), p. 53.
2. Notes on Collection of Hawaiian Insects on Island of Maui (with W. M. Giffard). loc. cit., p. 50.
3. Control of the Melon Fly in Hawaii by a Parasite introduced from India. Proc. Third Ent. Meeting held at Pusa, India. Feb., 1918.
4. Report of the Entomologist. Biennial Report Board Agriculture and Forestry for period ended Dec. 31, 1918.
5. The Fern Weevil Menace. Hawaiian Forester & Agriculturist, v. XVII (1), p. 3.
6. New Genera and Species of Braconidae, mostly Malayan. (In press.)
7. Natural Control of Scale Insects in Hawaii. (In press.)
8. New Species of *Sierola* with Explanatory Notes. (In press.)
9. A New Species of Fruitfly Parasite from Java (*Ilymenoptera*). (In press.)
10. The Fern Weevil *Syagrius fulvitaris* Pasc. (In preparation.)
11. Notes on Termites or White Ants in Hawaii. (In preparation.)

Respectfully submitted,

D. T. FULLAWAY,  
Entomologist.

TABULATION SHOWING THE LIBERATION OF BENEFICIAL  
INSECTS, 1919.

	Oahu.	Kauai.	Molokai.	Maui.	Hawaii.	Total.
<i>Fruit Fly Parasites</i> .*						
<i>Galesus silvestri</i> .....	7,710	.....	.....	.....	.....	7,710
<i>Diachasma tryoni</i> .....	11,250	.....	.....	360	855	12,465
<i>Tetrastichus giffardianus</i> ..	25,875	.....	.....	700	2,100	28,675
<i>Dirhinus giffardi</i> .....	3,640	.....	.....	.....	.....	3,640
<i>Opius humilis</i> .....	6,050	.....	.....	40	810	6,900
<i>Diachasma fullawayi</i> .....	2,175	.....	.....	100	50	2,325
Total . .....	56,700	.....	.....	1,200	3,815	61,715
<i>Melon Fly Parasite</i> :†						
<i>Opius fletcheri</i> .....	41,245	.....	.....	50	4,400	45,695

\* Liberated at: Oahu—Nuuanu, Kaimuki, Moanalua, Waipahu, Makiki, Kalihi, Pearl Harbor, Pupukea, Wyllie Street, Manoa. Hawaii—Kohala, Kamuela, Honokaa, Hilo, Pepeekeo, Hawi. Maui—Wailuku, Paia.

† Liberated at: Oahu—Moiiliili, Manoa, Lualualei, Makiki, Kaawa, Ft. Kamehameha, Wahiawa, Kailua, Pearl Harbor, Maunawai, Pupukea, Nuuanu, Kalihi, Waialua, Moanalua, Waipahu. Hawaii—Hilo, Kamuela, Pepeekeo, Glenwood, Kapoho. Maui—Wailuku.

*Corn Leaf Hopper**Parasite :‡*

Paranagrus osborni . . . . .	82,600	33,100	7,000	2,000	29,500	154,200
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*Horn Fly Parasites :°*

Spalangia cameroni . . . . .	4,950	.....	....	2,350	.....	7,300
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Pachycrepoides dubius... ..	150	.....	....	....	.....	150
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	<hr/> 5,100	<hr/> .....	<hr/> ....	<hr/> 2,350	<hr/> .....	<hr/> 7,450
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## DIVISION OF PLANT INSPECTION.

Honolulu, December 31, 1919.

Honorable Board of Commissioners of Agriculture and Forestry.  
Honolulu, T. H.

GENTLEMEN :—I have the honor to submit herewith a brief report covering the activities of the Division of Plant Inspection during the calendar year 1919.

The work performed by the Chief Plant Inspector and his assistants during this period consisted of the following:

1. The general inspection and supervision of all fruit, vegetable, plant and seed shipments arriving in the Territory from the mainland of the United States and from foreign countries in order to prevent the introduction of insect pests and plant diseases which are injurious to agricultural interests in those countries.

2. The inspection of fruits, vegetables and plants, including sugar cane, taro, and lily root used for consumption, which are shipped from the Port of Honolulu to all ports of the other islands. The purpose of this inspection is to prevent, as far as possible, the spread of any insect pest or plant disease accidentally introduced on Oahu, of which Honolulu is the port of entry, to any of the other islands.

## STAFF.

The undersigned has continued as Chief Plant Inspector during the year and has had the following assistants to perform the work of the Division: Mr. D. B. Langford, who acted as assistant inspector up to August 1, when he was granted a year's leave. Messrs. Edward Drew, Isaac Kahele Joshua and M. Mito, who have acted as inspector assistants and guards. Miss Ruth Seybolt has acted as clerk and stenographer. Brother Matthias

‡ Liberated at: Oahu—Makiki Nursery, Kalihi, Manoa, Wahiawa, Kailua, Schofield Barracks. Hawaii—Kohala, Hawi, Kamuela. Kauai—Lihue, Kealia, Kilauea. Maui—Kula. Molokai—Pukoo.

° Liberated at: Oahu—Wahiawa, Maunawai, Moanalua, Pearl Harbor. Maui—Paia.

Newell has continued as fruit and plant inspector at the Port of Hilo, and Mr. Will J. Cooper as inspector at the Port of Kahului and other landings on Maui.

The following honorary inspectors have been serving the Division on the other islands: Mr. E. E. Madden, Mahukona, Hawaii; Mr. George B. Leavitt, Eleele, Kauai, and Mr. G. C. Munro, Keomuku, Lanai.

#### EQUIPMENT.

The equipment remains the same as last year, but it was found necessary, owing to faulty construction, to make some necessary repairs to the floors of the main building, which settled and cracked, and also to raise the floors in the fumigating rooms. These were on a level with the yard floor and during heavy rains the water would enter under the doors.

The last legislature provided ample funds for further improvements. The roofing over the yard between the main and rear building is necessary, for in rainy weather we have had trouble in keeping deliveries for the fumigating vaults dry. It is also contemplated to put an addition to the rear building into which will be placed a vacuum fumigator. This will be very useful for the fumigation of dense materials into which the ordinary gases or fumes cannot penetrate sufficiently to guarantee absolute safety.

The additional land which has been set aside by the Governor's proclamation will allow us more room for other buildings in the future and we can now fence in the property with a high fence and necessary gates which will prevent the loitering of undesirables around the premises.

#### WORK PERFORMED.

During the year 1919 we inspected 838 vessels arriving at the Ports of Honolulu, Hilo and Kahului. Of these 298 vessels carried vegetable matter, consisting of 11,728 lots and 263,331 packages. Of these 246,619 packages were fruits and vegetables, chiefly from the mainland of the United States and imported as food for local consumption; 2,158 packages were seeds of trees, shrubs, flowers, vegetables and cereals, and 6,665 packages were plants and roots.

Out of all these shipments, 810 packages were destroyed, having been found infested with serious pests or being contraband shipments under rulings of the Federal Horticultural Board of Washington, D. C.; 6,220 packages were fumigated before delivery, either on account of slight infestation with pests already here in the islands or as a precautionary measure, and 42 packages were refused entry, either being returned to the shipper or sent back on board the vessel bringing them.



## RICE AND BEAN SHIPMENTS.

During 1919, 209,289 bags of rice and 31,757 bags of various kinds of beans arrived in the Territory through the Ports of Honolulu and Hilo from Japan and China ports. All these shipments were thoroughly inspected and found free from cereal pests. A thorough understanding and cooperation with the authorities at Japanese ports in regard to enforcing Rule III of the Board of Agriculture and Forestry has done much to prevent infested shipments being made. However, on account of infested shipments of rice and beans destined to mainland ports being placed in the hold of the steamer carrying shipments for Hawaii, there is always an uncertainty of clean shipments arriving. Our splendid equipment in Honolulu could readily handle infested shipments, but not so at Hilo, where occasionally shipments go direct on steamers of the T. K. K. South American line. From allotted funds we contemplate erecting a large fumigating vault at Hilo for the purpose of handling infested shipments should such be found in the future.

## INTER-ISLAND INSPECTION.

During 1919 we have continued the inspection of horticultural products shipped from Honolulu to all other island ports. On June 1, Rule XX of the Division of Plant Inspection went into effect. As this rule prohibits the taking of soil, earth or sand attached to the roots of plants, we have been very careful not to allow any plant shipments to leave Oahu until they have been thoroughly inspected and all soil washed from the roots. Since the discovery of the Australian fern weevil on Hawaii, and a ginger weevil on Oahu, we have stopped all fern and ginger plant shipments to the other islands.

Seven hundred and four steamers plying between Honolulu and ports of the other islands were attended to during the year and 41,461 packages of plants, fruits, vegetables and sugar cane were inspected. Of this number 182 packages were rejected either on account of infestation or as not complying with the regulations of the Board.

## FEDERAL HORTICULTURAL BOARD.

On June 1, 1919, the Federal Horticultural Board of Washington, D. C., published and passed Notice of Quarantine No. 37, with regulations. These regulations govern the importation of nursery stocks, plants and plant products from foreign countries. Regulation 3 enumerates the classes of plants which may be imported for propagation *under permit* and in compliance with the other requirements of the regulations. All shipments must be free from sand, soil or earth. Since the passing of these regula-

tions very few shipments of plants and seeds have entered the Territory and all shipments which do not conform with the regulations are seized and destroyed. Owing to two serious plant diseases (Flag smut and Take-all) attacking various cereals, the latter known to exist in Australia, Germany, Belgium, Italy, France, Great Britain, Ireland and Brazil, and the former known to exist in India, Japan and Australia, all seed or paddy rice, wheat, oats, barley and rye in the raw, uncleaned or unprocessed state for planting, is prohibited from entry into the United States or its Territories from any of the above countries under Quarantine Notice No. 39.

#### PESTS INTERCEPTED.

During the year a number of dangerous insect pests and fungous diseases were intercepted in the course of inspection. Chrysanthemum plants from Japan were seized and burned on account of a Lepidopterous borer in the stems. A package from Porto Rico containing taro which showed signs of a disease was destroyed by burning. Fig trees from Japan were infested with larvae of a wood-boring beetle (*Cerambycidae*); gladiolus bulbs infested with *Aphis*; peas from Japan infested with the Pea Weevil (*Bruchus pisorum*); loquat seeds from Japan infested with weevils, and various scale insects, all of which were found on plant shipments.

Respectfully submitted,

E. M. EHRHORN,  
Chief Plant Inspector.

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#### DIVISION OF ANIMAL INDUSTRY.

Honolulu, April 19, 1920.

Board of Commissioners of Agriculture and Forestry,  
Honolulu, T. H.

GENTLEMEN:—I have the honor to submit the following brief report covering the work of the Division of Animal Industry for the calendar year 1919.

#### IMPORTATIONS OF LIVE STOCK.

The following live stock were imported into the Territory:

Horses . . . . .	218
Mules . . . . .	316
Cattle . . . . .	114
Sheep . . . . .	50
Swine . . . . .	11
Dogs . . . . .	51
Cats . . . . .	2
Poultry . . . . .	515 crates

With the exception of fifty sheep and a few dogs, which came from New Zealand, all the rest came from the mainland of the United States and all were subjected to either quarantine, rigid inspection, tuberculin or mallein test, dipping or disinfection before being admitted to the Territory, and it may safely be said that, with the exception of a few cases of incipient tuberculosis which were apprehended later, no disease gained entrance with them. Excepting a few race horses, polo ponies and stallions the horses and mules were principally army animals, while the cattle, sheep and swine were either dairy cows or purebred breeding stock.

During the year the rules and regulations governing the importation of live stock were revised and much strengthened, while certain restrictions were placed on cattle in inter-island traffic.

#### CONTROL OF LIVE STOCK DISEASES WITHIN THE TERRITORY.

The great *anthrax* epidemic of 1917, which cost the Territory and its live stock industry in the neighborhood of one hundred thousand dollars, has been completely suppressed in so far as Oahu and Maui are concerned. On these islands no case occurred during the year and vaccination was discontinued. On Kauai one case occurred and vaccination of all animals on the principally infected ranch is still carried on.

The eradication of *bovine tuberculosis* has been vigorously prosecuted during the past year. The new indemnification act passed by the 1919 Legislature has proved very effective, especially in simplifying the appraisal of condemned animals, in allowing more liberal compensation and in authorizing the testing of beef cattle when tuberculosis is suspected. Without this latter measure all efforts at complete eradication would have proved ineffective. As it is the number of dairies free from tuberculosis is steadily increasing and the number of affected animals encountered is diminishing fast. Furthermore, the persistent objection of certain dairymen to have their herds tested regularly has practically disappeared.

Neither *glanders* nor *epizootic lymphangitis* in horses or mules has been encountered during the past year, nor has *hog-cholera* been reported. A few outbreaks of *swine plague* (hemorrhagic septicemia) have occurred, but when promptly reported they have been easily controlled by vaccination.

An apparently new disease or a new form of an old disease, *tongue paralysis* in cattle, may possibly prove to be a chronic form of hemorrhagic septicemia. Should this prove to be the case the Division is well prepared to control its further spread.

#### ANIMAL INDUSTRY REVOLVING FUND.

An act appropriating \$5,000.00 for the purpose of purchasing

and distributing at cost serums, vaccines and similar biologic remedies was passed by the 1919 legislature. Under its provisions this office now keeps on hand in sufficient quantities to check an outbreak such bacterial preventive and curative remedies for diseases of animals as, owing to easy deterioration, cannot be carried by the local druggists.

Among such diseases may be mentioned anthrax, hemorrhagic septicemia in horses, cattle and swine (swine plague), infectious abortion and metritis in cattle and keratitis (pink eye) in cattle. The remedies are distributed through and applied by the deputy territorial veterinarians who collect for the same and remit to the Animal Industry Revolving Fund through this office.

Respectfully submitted,

VICTOR A. NORGAARD,  
Territorial Veterinarian.

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## Division of Forestry

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Honolulu, April 19, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu.

Gentlemen:—I respectfully submit the following routine report of the Division of Forestry for the month of March, 1920:

### TREE PLANTING.

During the month 687 koa trees were planted on the Honolulu Watershed Reserve in Makiki, and at Mikilua, in the Lualualei Reserve, 993 koa trees and 2,673 red gum trees were set out, making a total of 4,353 trees planted. At the Waiahole Nursery several thousand red cedar seedling trees were transplanted into tins.

Several pounds of good koa seeds were received from Kauai during the month. Arrangements for securing these were made through Ranger Hardy.

### FOREST FENCING.

One-half mile of American fence wire was sent to the Raymond Ranch which has agreed to erect the same and close up the gap between Kana-hau and Kalepeamoa. This will give the Kula Forest Reserve on Maui complete protection from wild cattle on the Kahikinui side and the contemplated tree planting can then begin.

### ANNUAL REPORT.

A portion of the month was spent in the preparation of the annual report for this Division, which is submitted at this time.

### HAWAII AND MAUI TRIP.

From March 20 until the end of the month, I was on Hawaii and



Maui, as a special representative of the Territory detailed by the Acting Governor to accompany Mr. H. M. Albright, Field Assistant to the Director of the National Park Service on an official trip to the Hawaii National Park. The principal points of interest visited were Kilauea, the Kau flow, Puuhuluhulu, Puu Ulaula, at an elevation of 10,300 feet on Mauna Loa, and Kona, on Hawaii, and Iao Valley and Haleakala on Maui. I also give Mr. Albright assistance by securing maps and information pertaining to the pending acquisition of private lands within the Kilauea Section and to government lands for the purpose of enlarging the present area of this section.

Respectfully submitted,

C. S. JUDD,  
Superintendent of Forestry.

#### REPORT OF FOREST NURSERYMAN.

Honolulu, April 16, 1920.

Superintendent of Forestry, Honolulu, T. H.

Dear Sir:—I herewith submit a report of the work done during the month of March:

#### NURSERY.

##### Distribution of Plants—

	Seed Boxes.	Transplant Boxes.	Pot Grown.	Total.
Sold . . . . .	50	74	124	
Gratis (including forest reserve)	22,000	500	898	23,398
Total . . . . .	22,000	550	972	23,522

#### COLLECTIONS.

##### Preservation Forest Reserves—

###### Black Sand.

March 31.

145 loads black sand taken from Makiki Sand Pit at 50c. \$ 72.50  
Charcoal.

16 bags charcoal including commission, Terr. Market. \$ 8.92  
Rents and Fees.

Rent of premises at Halfway House, Tantalus, for quarter ending March 31, 1920, at \$10.00 per month. . . . . 30.00

Fees for use of land and gathering ti leaves, Kalawahine, Pauoa Valley, for quarter ending March 31. . . . . 12.50  
Camp Sites—Kokee Camp, Kauai.

Rental fees for period from January 1 to December 31, 1920, Camp Sites Nos. 1, 23, 84, 14, 46, 18. . . . . 113.00

\$236.92

## Government Realizations—

Collections on account of plants sold.....	\$30.75
(Including \$28.00 from Joe Rita, Jr., for plants sold at Papapaholahola Spring, Kalaheo, Kauai.)	
Rent of Office, Nursery Grounds for February.....	35.00
	<hr/>
	\$65.75

## Animal Industry Revolving Fund—

Mar. 31—To 5 gals. disinfectant delivered to George J. Brown, Kalihi Farm .....	\$12.50
To Hemorrhagic septicemia vaccine for cattle, J. W. Reis.....	17.10
	<hr/>
	\$29.60

## MAKIKI STATION.

The work done at this station during the month consisted of the mixing and sterilizing of soil, transplanting and potting plants, etc.

## HONOLULU WATERSHED.

A total of 687 koa trees were planted on land behind Sugar-loaf hill and adjoining the Schmidt estate on Sugar-loaf side.

## HAIKU NURSERY, MAUI.

Mr. James Lindsay reports the following distribution of plants from the Haiku Nursery:

	Seed Boxes.	Transplant Boxes.	Pot Grown.	Total.
For the year 1919.....	40,500	...	...	40,500
“ January, 1920 .....	3,450	...	...	3,450
“ February, 1920 .....	5,500	271	...	5,771
“ March, 1920 .....	1,000	2,400	29	3,429

## HILO NURSERY, HAWAII.

Bro. M. Newell reports that he distributed from the Hilo Nursery 420 plants in transplant boxes and 76 pot grown—total 496 plants.

KAUAI NURSERY, PAPAPAHOLAHOLA SPRING, KALAHEO,  
KAUAI.

Joe Rita, Jr., reports that he distributed 300 Eucalyptus robusta during the month of March.

## ADVICE AND ASSISTANCE.

The writer has been called upon to visit and assist the officers at the following military posts in planting and laying out their grounds: Fort Armstrong, Fort Kamehameha, Fort Ruger, Pearl Harbor Hospital, Luke Field, Ford Island. We have supplied a number of plants to each post and are propagating more to be given when ready.

At Luke Field there is practically nothing in the line of plants and the officers are very anxious to have the place made beautiful and greatly appreciate any plants and assistance we may be able to give them.

A cordial invitation from Captain Olds, assistant to the Commanding Officer, Colonel Curry, is extended to members of the Forestry Division

to take advantage of any assistance they may be able to give in aiding us in the forestry work. The use of their planes this gentleman assured me would gladly be given for the purpose of examining the forests on the mountains of Oahu or in the case of fires, etc. I am personally indebted to Colonel Curry and his officers for courtesies received while visiting and especially for the very pleasant trip in an aeroplane with Lieut. Elliot from Luke Field to Kapiolani Park.

The writer has, at the request of people in and around the city, made the following number of calls and otherwise given advice and assistance as follows:

Calls made .....	8
Advice by phone.....	5
People calling .....	8

Respectfully submitted,

DAVID HAUGHS,  
Forest Nurseryman.

## Division of Entomology

Honolulu, April 16, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—During the month of March the insectary handled 22,400 pupae of the melon fly, from which there were bred 3,410 females and 3,044 males *Opus fletcheri*.

The distribution of parasites was as follows:

### MELON FLY PARASITE.

#### *Opus fletcheri*.

	Females.	Males.
Oahu:		
Waianae .....	750	750
Keaau .....	1,600	1,600

### FRUIT FLY PARASITES.

#### *Diachasma fullawayi*.

Oahu:		
Kalihi Valley .....	150	150
Nuuanu .....	260	230

#### *Tetrastichus giffardianus*.

Oahu:		
Kalihi Valley.....	...	600
Nuuanu .....	...	1,500

#### *Opus humilis*.

Oahu:		
Kalihi Valley .....	100	100
Nuuanu .....	100	100

**Diachasma tryoni.**

Oahu:

Nuuanu .....	200	200
Kalihi .....	250	250

**Galesus silvestri.**

Oahu: Nuuanu Avenue.....	...	1,900
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**Dirhinus giffardi.**

Oahu: Nuuanu .....	...	900
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During the latter part of February and the entire month of March the entomologist was engaged at 29 Miles, Olaa, Hawaii, superintending the work authorized by the Board and intended to eradicate the fern weevil in that locality. It will be recalled that the work done in January was only calculated to contain the weevil in the original area of infestation and left a considerable part of the interior to be cleared and scarified. This had been roughly done earlier but the effort was entirely inadequate, the principal defects being (1) failure to destroy the fern stumps. (2) to kill the weevils which had fallen to the ground when the ferns were cut, and (3) to treat tree ferns and epyphytic ferns. It was planned on this occasion to clear the area thoroughly and completely of all ferns, so that there would be absolutely no material on which the weevil could live for a considerable period, and to treat the ground cover with poison in such a manner that all straggling weevils would be killed and the chance of their escape from the area obviated. Opposition was encountered at once in attempting to carry out this plan, the objection to it being that it was too drastic and unnecessarily interfered with the natural rights of property owners on the infested area. The land under the control of the government was treated as originally contemplated, although it ruined the koa part, but in dealing with the property owners it was considered necessary to compromise in order to avoid damage suits, and the work on the residence lots was not as complete and thorough as it should have been. One of the property owners elected to perform the Board's requirements personally and in view of the fact that the labor commanded was hardly adequate for the entire job, no objection was interposed, but it was stipulated that the work should be done satisfactorily and promptly as the law provides. The arrangement has, however, not proved good, as the person has been unable to secure the necessary labor and the work has been delayed. It is expected that by exerting pressure on this delinquent the work can be hurried and that by careful attention the situation can be daily improved and sooner or later mastered. It was impossible to find evidence of any new infestation, which is a fortunate circumstance.

The actual work performed during this period is as follows:

Koa grove—Thoroughly cleared and sprayed with arsenite of soda.

Deyo lot—Thoroughly cleared and sprayed with arsenite of soda in the rear portion. Middle portion sprayed during rainy weather. House lot, sprayed all ferns that could be found, spared all large ferns and flowers.

Bowman lot—Received the same treatment as the Deyo lot.

Kennedy lot—Sprayed during rainy weather.

Shipman lot—The area around lava tubes and a part of cow pasture, which Mr. Shipman fenced, was sprayed, partly during rainy weather. The hog pasture has not been sprayed. The house lot and cow pasture mauka of the house has not been sprayed. The ferns here are very sparse and are being hand-picked as often as convenient.

English lot—Referred to above. Not touched, on account of owner's election to treat it himself.

Respectfully submitted,

D. T. FULLAWAY,  
Entomologist.



## Division of Plant Inspection

Honolulu, March 31, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—I respectfully submit my report of the work carried on by the Division of Plant Inspection for the month of March, 1920, as follows:

During the month 70 vessels arrived at the Port of Honolulu, 18 of which carried vegetable matter and 15 vessels came through the Panama Canal Zone. The following disposal was made of the various shipments:

Passed as free from pests.....	1107 lots	16,067 pkgs.
Fumigated.....	16 “	16 “
Burned . . . . .	57 “	57 “
Returned . . . . .	2 “	104 “

Total Inspected.....	1182 “	16,244 “
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Of these shipments 15,810 packages arrived as freight, 252 packages as mail and 182 packages as baggage.

### RICE AND BEAN SHIPMENTS.

During the month 9864 bags of rice from Japan, 2000 mats of rice from China, and 1820 bags of beans from Japan arrived and were found free from pests.

### PESTS INTERCEPTED.

Approximately 3315 pieces of baggage belonging to immigrants from foreign countries were examined, from which 42 lots of fruit and 14 lots of vegetables were seized and destroyed.

On March 9, per Manoa, a package of seeds from Portugal in the mail was fumigated as a precaution.

On March 14, per Korea Maru, a package of pili nuts in the baggage of an immigrant from Manila was seized and destroyed on account of infestation. In the postoffice was found a package of bulbs from Manila and a package of rice paddy from Japan which were seized and destroyed. A bag of rice paddy in the cargo from Japan was seized and is being held pending disposal by the custom house. A package of tree seeds in the mail from Java for Dr. H. L. Lyon was fumigated as a precaution.

On March 18, per Venezuela, a package of rice paddy in the mail from Japan was seized and destroyed. A package of seeds from Java for Dr. H. L. Lyon by mail was fumigated as a precaution.

On March 20, 12 coconuts from Fanning Island were fumigated as a precaution.

On March 23, per Lurline, a plant in the American Railway Express was fumigated on account of plant lice.

On March 30, one lot, consisting of 100 bags of potatoes consigned to California Feed Company from San Francisco, was returned, being badly infested with potato scab.

### HILO INSPECTION.

Brother M. Newell, inspector at Hilo, reports the arrival of six steamers at the port of Hilo. Two carried vegetable matter consisting of 82 lots and 1911 parcels, all passed.

## KAHULUI INSPECTION.

Mr. Will J. Cooper, inspector at Kahului, reports the arrival of five vessels at the Port of Kahului. Two carried vegetable matter consisting of 11 lots and 692 packages, all passed as free from pests.

## INTER-ISLAND INSPECTION.

Sixty-one steamers plying between Honolulu and the other island ports were attended and the following shipments passed as free from pests:

Taro . . . . .	607 packages.
Vegetables . . . . .	376 “
Fruit . . . . .	242 cases.
Plants . . . . .	71 packages.
Seeds . . . . .	10 “
Pineapple Shoots . . . . .	1155 bags.
Sugar Cane . . . . .	80 cases.

Total Passed.....2541 packages.

Thirteen packages of plants and eight pieces of sugar cane were refused shipment on account of infestation, undesirable soil and not complying with the regulations.

**Citrus Canker:** I beg to report the discovery of citrus canker in a small orange grove belonging to M. Kawahara up Kalihi valley. When Prof. S. I. Kuwana, director of the Imperial plant quarantine station at Yokohama, Japan, visited us in January, he was invited by Mr. Kawahara to visit his place in Kalihi. On his return to my office he brought some leaves of citrus which showed a brownish fungus. Neither of us could say what it was and he suggested sending it to Dr. Karl F. Kellerman of the Federal Horticultural Board, Washington, D. C., who has charge of the work. On March 16 I received a cable from him as follows:

“Grapefruit leaves sent January by Kuwana infected citrus canker. I visit Hawaii May and can cooperate in control or eradication work. Cable immediately extent infected groves and precautions taken to prevent spread.”

I notified Mr. Judd, Executive Officer, and we at once visited Mr. Kawahara's place. We found about 35 young grapefruit trees infected and ordered them dug up and burned at once. Mr. Kawahara received these trees from a friend who lives at Palier, Fresno county, Cal., having bought them from a nurseryman in that locality. I visited Mr. Kawahara's place a couple of days after ordering the trees dug up and burned and found that my order had been carried out. I then sent the following cable to Dr. Kellerman:

“Only 35 young trees infected. Originally shipped from Fresno, Cal., 1916. Ordered burned. Nothing alarming; explain by letter.”

I also have notified the horticultural quarantine officer and the Director of Agriculture of California about this matter as I consider it very important to know that such trees came from Fresno county. I plan to continue my inspection of the Kawahara orchard as well as to carry on an inspection of Kalihi Valley and other localities. Now that we know what citrus canker looks like it will be easy to discover any appearance of the disease.

Respectfully submitted,

E. M. EHRHORN,  
Chief Plant Inspector.

## Division of Animal Industry

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Honolulu, April 19, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—I beg to submit herewith my report on the work of the Division of Animal Industry for the month of March, 1920:

### TONGUE PARALYSIS IN CATTLE.

For the past year or more a strange disease has been reported as appearing first on Molokai, later on Lanai and more recently on Maui and in the Kona district of Hawaii. The disease is characterized by the partial paralysis of the tongue, which interferes with the prehension and deglutition. As a result of this the affected animals become emaciated and finally die. On post-mortem examination nothing typical has been found except that the various stomachs contained poorly masticated food.

The last outbreak reported—the one from Maui—where Dr. Fitzgerald had made post-mortem examination of three typical cases, would seem to be a form of hemorrhagic septicemia, as he found bloody exudations in the chest cavity and discolorations on the heart.

As enlargement of the tongue has been mentioned in a report from Africa as occurring in hemorrhagic septicemia, it seems likely that this is the disease we are dealing with here. An enlarged tongue and a paralyzed tongue both protrude from the mouth and may easily be mistaken for each other.

Experiments are now under way to attempt to cure some of the typical cases with the hemorrhagic septicemia serum which we have on hand.

### INFECTIOUS ABORTION IN CATTLE.

This insidious and very destructive disease has unfortunately made its appearance in two dairy herds in Honolulu.

Dr. Rowat reports abortion very prevalent in South Kona, but states that the cattle owners believe it due to certain poisonous plants of the *Salvia* family.

We have obtained abortion bacterins as well as curative serum and are now treating the affected herds apparently with success.

### SWINE PLAGUE.

A large herd of swine at Watertown have developed swine plague. Unfortunately the owner failed to report it until about 75 head had died. Vaccination with swine plague bacterins and the administration of necrobacillosis powder in the food put an almost immediate stop to the outbreak.

### TUBERCULOSIS CONTROL.

In spite of the very heavy infections met with in the Waialae and Wailupe districts, the total number of reactors for the past year will fall below 1½%. The most important question now would seem to be the complete eradication of the disease from the Wailupe district. The matter is under consideration and the Division is ready to proceed as soon as the required facilities for a complete round-up have been provided.

## DOGS ON BOARD U. S. VESSELS.

Copies of correspondence addressed to the commanding officer at the naval station at Pearl Harbor, to the commander of the Honolulu naval yard and to the officer in charge of the U. S. transport service are appended for the Board's information.

Respectfully submitted,

VICTOR A. NORGAARD,  
Territorial Veterinarian.

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Territory of Hawaii, Board of Commissioners of Agriculture and Forestry, Honolulu, Hawaii, April 8, 1920.

Dr. V. A. Norgaard, Territorial Veterinarian, Honolulu.

Dear Sir:—President Rice has directed that you take the necessary steps concerning the dogs on board the destroyers and cruisers now in port.

Very truly yours,

(Sgd.) C. S. JUDD,  
Executive Officer.

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April 7, 1920.

From: The Board of Commissioners of Agriculture and Forestry.  
To: Officers in Charge of the U. S. Transport Service, Port of Honolulu.

Subject: Bringing Dogs into the Territory on U. S. Transport in Contravention of the Regulations of this Board.

Sir:—Your attention is called to the following facts:

1. Rabies or hydrophobia remains prevalent among dogs and other animals on the mainland of the United States, and especially in the Pacific Coast and Nevada.

2. Rabies can only gain entrance into this Territory, where it has never yet occurred, by means of dogs and other animals, generally referred to as "mascots," introduced in contravention of Rule VIII of this Board (copy enclosed) and which requires that such animals be quarantined for one hundred and twenty (120) days before admission to the Territory.

3. Within the past year officers of this Board have twice apprehended dogs on transports (transport Sherman, April 13, 1919, and the transport Logan, February 15, 1920), which undoubtedly would have gained entrance here except for unofficial information reaching said officers, leading to the apprehension and quarantine of the animals.

4. In both cases neither the Master nor the quartermaster agent on board had any knowledge of the presence of these animals on board.

5. In the case of the transport Sherman the quartermaster agent on board stated that it was impossible for him to enforce the department quartermaster's regulations forbidding the presence on board of dogs or other animals on the transport.

6. The Territorial Veterinarian and his assistant and inspectors have reason to believe that the two cases specified above constitute but a fraction of similar attempts which have succeeded.

7. Your attention is called to the correspondence on the same subject between your office and that of the Territorial Veterinarian of



this Board, dating from August 13, 1914, and subsequent dates, which undoubtedly you have on file in your office.

8. Your cooperation in the enforcement of the regulation referred to and which it is believed is imperative in preventing rabies or hydrophobia from gaining entrance into the Territory, is respectfully requested.

BOARD OF COMMISSIONERS OF AGRICULTURE  
AND FORESTRY,

By its President,  
(Sgd.) A. H. RICE.

Deputy Zone Supply Office, 13th Zone, Honolulu, T. H., 15 April, 1920.  
From: Office Deputy Port & Zone Transportation Officer.

To: Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.

Subject: Bringing dogs into the Territory on U. S. A. Transports.

1. Reference your letter of the 7th inst., subject—"Bringing dogs into the Territory on U. S. Transports, in contravention of the regulations of this Board." A copy of your letter has been forwarded to the port and zone transportation officer, Fort Mason, San Francisco, California, with the request that the necessary instructions be issued to all those concerned.

2. This office will keep a sharp look-out for any dogs that may arrive on transports and your office will be immediately informed in the event any dogs are apprehended so that they may be taken and quarantined for the prescribed period before being admitted into the Territory.

By authority of the port and zone transportation officer:

(Sgd.) A. H. DAVIDSON,  
Captain, Cavalry, Assistant.

April 9, 1920.

From: The Territorial Veterinarian.

To: The Commanding Officer, Naval Station, Pearl Harbor.

Subject: Dogs and Other Animals Aboard U. S. Vessels in Territorial Waters.

Sir:—Your attention is called to the following:

1. About a year ago the Territorial Veterinarian was assured by the Commanding Officer, U. S. Naval Station, Pearl Harbor, of his cooperation in enforcing Rule VIII of the Division of Animal Industry, entitled "Dogs on Board Steamers and Other Vessels" (copy enclosed).

2. On the 1st instant, an inspector from this office delivered at the office of the Assistant Captain of Yard, Naval Station, Honolulu, thirty-five (35) copies of this rule, with the request that they be furnished to the commanding officer of each of the vessels of the visiting fleet.

3. A dog has been lost from the U. S. S. Rizal, or rather from the coaling dock along which the Rizal was moored.

4. The dog should not have been allowed ashore.

5. Copy of a letter addressed to the officer in charge of the U. S. Transport Service, Port of Honolulu, is enclosed for your information.

6. The Board of Commissioners of Agriculture and Forestry respectfully request your cooperation in enforcing Rule VIII.

(Sgd.) VICTOR A. NORGAARD,  
Territorial Veterinarian.

April 9, 1920.

From: The Territorial Veterinarian.

To: The Assistant Captain of Yard, Naval Station, Honolulu.

Subject: Dog from U. S. S. Rizal Escaped from Coal Docks.

Sir:—Your attention is respectfully called to the following:

1. On April 1, an inspector from this office when attempting to deliver on board copies of Rule VIII of this Division, pertaining to the presence of dogs on board steamers and other vessels, the officer of the dock referred him to your office where he delivered thirty-five (35) copies of said rule, with the request that the same be delivered to the commanding officer of each of the vessels of the visiting fleet.

2. A dog has been lost from the U. S. S. Rizal, or rather from the coaling dock along which the Rizal was moored.

3. The dog should not have been allowed ashore.

4. Copy of a letter addressed to the officer in charge U. S. Transport Service, Port of Honolulu, is enclosed for your information.

5. The Board of Commissioners of Agriculture and Forestry respectfully request your cooperation in enforcing Rule VIII.

(Sgd.) VICTOR A. NORGAARD,  
Territorial Veterinarian.

U. S. Naval Station, Hawaii, Pearl Harbor, T. H., April 9th, 1920.  
Dr. Victor A. Norgaard, Territorial Veterinarian, Box 207, Honolulu, T. H.

Dear Sir:—In reference to your letter of April 7th, 1920, in regard to the copies of Rule VIII, they were received at this office and promptly forwarded to each vessel in the harbor.

Yours truly,  
(Sgd.) S. WATSON.

#### REPORT OF ASSISTANT VETERINARIAN.

Honolulu, April 20, 1920.

Dr. V. A. Norgaard, Chief, Division of Animal Industry, Honolulu.

Sir:—I beg to submit the following routine reports for the month of March:

#### TUBERCULOSIS CONTROL.

The following cattle were tested during the past month:

	Tested.	Passed.	Con- demned.
O. R. & L. Co.....	418	418	0
F. S. Lyman.....	38	38	0
O. R. & L. Co.....	142	142	0
American Factors, Ltd.....	1	1	0
C. A. Long.....	33	33	0
J. H. Cummings.....	12	12	0
V. Souza .....	8	8	0
F. Fernandez .....	1	1	0
Akiona Afong .....	2	2	0
D. Barriomebo.....	1	0	1
M. Pogau .....	1	1	0
H. Kobelauski .....	2	2	0
Jose Lario .....	1	1	0
A. S. Kenway.....	2	1	1
A. Reinicke .....	7	7	0
Capt. Hartman .....	3	3	0
T. Nakamoto .....	37	36	1
Fred Luning .....	14	13	1
A. Pacheco .....	1	1	0
M. H. Sanders .....	3	3	0

M. T. Brazon.....	41	39	2
C. Oshiro .....	32	31	1
A. Boniza .....	12	12	0
T. Nakamura .....	36	36	0
Himen & Freitas.....	24	24	0
A. Lopez .....	12	12	0
Pedro Deas .....	12	11	1
J. Simon .....	3	3	0
A. Compos .....	15	15	0
J. Himers .....	13	13	0
C. Borozo .....	17	17	0
M. Salado .....	7	7	0
S. Hirata .....	43	43	0
A. Reis .....	35	34	1
P. Martinez .....	18	18	0
R. Hind .....	12	12	0
D. Yamashita .....	52	51	1
Shimabuku .....	25	23	2
J. Horrillo .....	10	10	0
J. Himeni .....	36	36	0
S. I. Shaw .....	14	12	2
S. K. Maii.....	2	2	0
M. T. Brazon.....	2	2	0
M. S. Teixeira.....	2	2	0
R. Tomita .....	5	5	0
On Young .....	216	210	6
Waialua Plantation Co.....	8	8	0
O. R. & L. Co.....	418	410	8
Oscar Cox .....	2	2	0
O. R. & L. Co.....	20	20	0
American Factors, Ltd.....	4	4	0
S. Shimidsu .....	26	26	0

From the above list it will be seen that a total of 1901 head of cattle were tested, out of which number 1873 were passed and 28 condemned, branded and slaughtered.

Besides the above testing, 28 condemned cattle were post-mortemed at the Puuhale abattoir, all of which were found affected with tuberculosis.

#### IMPORTATIONS OF LIVE STOCK.

During the past month the Live Stock Inspector boarded 20 vessels, of which number the following were found to carry live stock for this Territory:

S. S. Hyades, San Francisco: 1 bull, American Factors, Ltd.

S. S. Manoa, San Francisco: 4 Hampshire hogs, J. H. Wilson; 45 ets. poultry.

S. S. Cawthorn, Orient: 5 chow dogs, Mr. Lillis; Mr. Kennedy and Mr. T. M. McGuire.

S. S. Wilhelmina, San Francisco: 1 dog, R. A. Ducoe.

S. S. Lurline, San Francisco: 1 dog, Major Clement; 12 mules, American Factors, Ltd.; 4 Hereford bulls, American Factors, Ltd., 20 mules, City Mill Co.; 2 Berkshire hogs, College of Hawaii.

S. S. Lurline, San Francisco: 2 hogs, Hawaii Meat Co.; 56 ets. poultry, Various; 10 mules, Haiku F. & P. Co., Maui.

S. S. Sonoma, San Francisco: 1 dog, S. S. Paxson.

Respectfully submitted,

LEONARD N. CASE,  
Asst. Territorial Veterinarian.

## By Authority

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### PERMITS TO START FIRES REQUIRED.

Notice is hereby given that, in accordance with Sec. 497, R. L. H. 1915, IT IS FORBIDDEN to start fires to clear land, including the burning of fallows, stumps, logs, brush, dry grass or fallen timber, for a period of eight (8) months from date on any land, other than cane land, within the City and County of Honolulu unless written permission has first been obtained from the local fire warden or from the Chief Fire Warden, Government Nursery, 1438 S. King St., Honolulu.

The law requires that "such fires shall not be started during a heavy wind or without sufficient help present to control the same, and the fire shall be watched by the person setting the same, or by competent agents of his, until put out."

C. S. JUDD,  
Chief Fire Warden.

Honolulu, T. H., May 3, 1920.

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### TERRITORY OF HAWAII.

#### BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY.

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#### RULE XXI—DIVISION OF PLANT INSPECTION.

##### RULE AND REGULATION OF THE BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY CONCERNING THE CONTROL OF CERTAIN INSECT AND PLANT PESTS.

The Board of Commissioners of Agriculture and Forestry of the Territory of Hawaii hereby amends Rule XXI of the Division of Plant Inspection, approved February 25, 1920, concerning the control of certain insect pests and plant pests in the Territory of Hawaii, so as to read as follows:

Section 1. No white ginger root, (*Hedychium coronarium*), no fern plant or part thereof, and no Spanish moss, (*Tillandsia usneoides*), otherwise known as Florida moss or old man's beard, shall be carried, transported, or shipped from any one island in this Territory to any other island in this Territory, except by special written permit from the Board of Agriculture and Forestry.

Section 2. No white ginger root, no fern plant or part thereof, and no Spanish moss shall be transported in any manner from one part or locality of any island to another part or locality of the same island, except by special written permit from the Board of Agriculture and Forestry.

Section 3. Inspectors and other duly authorized agents of the Board of Agriculture and Forestry are hereby empowered to examine and inspect all freight, baggage, and belongings leaving or arriving at any port of the Territory or being transported from one part or locality of any island to another part or locality of the same island and to destroy any and all white ginger roots, any and all fern plants or parts thereof,



and any and all Spanish moss found among or in such freight, baggage and belongings.

Section 4. Any person violating the above rule shall be guilty of a misdemeanor and upon conviction thereof shall be punished by a fine not to exceed Five Hundred Dollars (\$500.00) as provided by Section 529 of the Revised Laws of 1915.

Section 5. This rule as amended shall take effect upon its approval by the Governor.

Approved this 7th day of May, 1920.

C. J. McCARTHY,  
Governor of Hawaii.

Honolulu, T. H.

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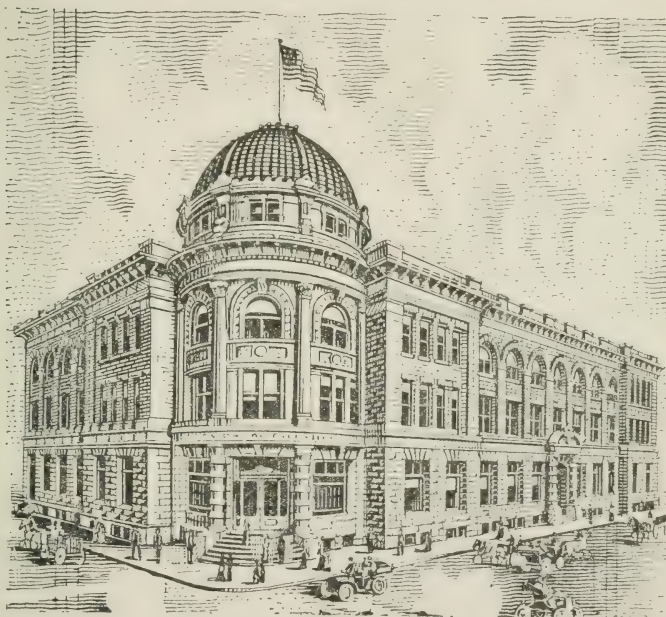
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(1920)

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# THE HAWAIIAN FORESTER AND AGRICULTURIST

JUNE, 1920

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# Board of Agriculture and Forestry

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Trees for planting on Windward Kauai may be obtained from the Kapaa School by applying to Mr. Geo. S. Raymond, Principal.

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C. S. JUDD,  
Superintendent of Forestry.

## DIVISION OF ENTOMOLOGY.

To give information about insects free of charge is one of the duties of this Division, and Hawaiian readers are hereby invited to make inquiry in person and by mail. In order to be able to advise intelligently or send the right kind of useful insects for relief, we like and sometimes it is indispensable for us to see the insects suspected or caught in the act, also specimens of the injury. In a tin with a hole or two, or a wooden box, specimens may be mailed by parcels post. When specimens are not accompanied by letter, always write your name and address in the upper left-hand corner of the package. Address all communications, DIVISION OF ENTOMOLOGY, P. O. BOX 207, HONOLULU, HAWAII.

D. T. FULLAWAY,  
Entomologist.

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A complete list of the publications of the Board available for distribution (together with the titles of certain issues now out of print) is to be found on the cover of the last biennial report.

Applications for publications should be addressed to the Mailing Clerk, P. O. Box 207, Honolulu, Hawaii.

# THE HAWAIIAN FORESTER AND AGRICULTURIST

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VOL. XVII.

HONOLULU, JUNE, 1920.

No. 6

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The work of controlling the fern weevil at 29 Miles, Olaa, Hawaii, was about completed during May as pointed out in the current report of the Entomologist.

The dangerous spread of the Hilo grass into our higher mountain areas of indigenous forest caused by the presence of trails through them is pointed out in the current report of the Superintendent of Forestry.

Among the unusual trees planted out by the Division of Forestry during April were Kauri pine, Norfolk Island pine, narra or Indian bloodwood, Arabian teak, bastard sandalwood, or *naio*, and the red pine or *rimu* of New Zealand.

Rule XII of the Division of Plant Inspection was on May 24 amended by the Board and new Rule XXII of the same Division was on the same date adopted by the Board. Further details concerning these rules are contained in this issue.

Section 5 of Rule XX of the Division of Plant Inspection was on the recommendation of President Atkinson amended by vote of the Board on May 24, and the amended section which was approved by the Governor on June 1, 1920, appears on the By Authority pages of this issue.

On May 24, 1920, the Board confirmed the appointment of Mr. L. A. Whitney of San Francisco, as Assistant Plant Quarantine Inspector and Laboratory Assistant in the Division of Plant Inspection. Mr. Whitney was secured by Commissioner Giffard and having been for six years boarding officer and for two years technical assistant in the Office of Plant Quarantine in the Department of Agriculture of the State of California, comes well recommended. He is expected to arrive in Honolulu on June 15 to take up his new duties.

Since the inauguration of the campaign for the eradication of bovine tuberculosis ten years ago, the lowest percentage of reactors to the tuberculin test was reached. During April out of

JUL 21 1920

562 head of dairy cattle tested only 6 animals or 1.06 per cent were found to be affected with the disease.

---

A public hearing to consider certain changes in several forest reserves has been called by the Governor and the Commissioners and will be held at the office of the Board on King street on Wednesday, June 9, at 2 o'clock p. m. On the same day and place at 2:30 o'clock p. m. a public hearing will be held for the presentation of arguments for or against the adoption of Rule V of the Division of Forestry which proposes to prohibit tramping, in the interest of forest protection, on the upper mountain slopes at the headwaters of Manoa and Palolo Valleys.

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## Recent Board Appointments

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Charles J. Kraebel, *Assistant Superintendent of Forestry*, March 18, 1920. Pay to commence when he reports for duty.

James Henderson, *District Fire Warden* in and for that portion of the District of Hilo, Hawaii, extending from the Puna District line to and including the land of Kikala. March 18, 1920.

L. A. Whitney, *Assistant Plant Quarantine Inspector and Laboratory Assistant* in the Division of Plant Inspection. May 24, 1920. Pay to commence when he reports for duty.

H. P. Agee, *Honorary Plant Inspector*. May 4, 1920.

J. P. Pico, *Forest Ranger* for the Waianae-kai Forest Reserve. Oahu. May 24, 1920.

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## Rabid Animals in West

---

That the killing of wild animals afflicted with rabies is an important phase of the work carried on by the Bureau of Biological Survey, United States Department of Agriculture, is indicated by reports received from the bureau's skilled hunters in the West. In western regions where predatory animals are found both human life and live stock are seriously menaced when rabies appears. In Washington, for example, one of the hunters reported that a rabid coyote had attacked two boys sleeping in a haystack and had badly torn the bedquilts covering them before he was driven off. In Oregon a young woman was set upon by a rabid coyote, which finally ran into a store, where it was shot. The following day three school children on horseback in the same



locality were attacked by another coyote, which they succeeded in killing at serious risk to themselves. On a farm near Olympia, Wash., five head of cattle, one hog, and four dogs were killed because they were afflicted with rabies.

A hunter in Bannock County, Idaho, stated that he was endeavoring to locate rabid coyotes in his region, believing them responsible for the loss of many cattle in that vicinity which had gone mad. In five of the Northwestern States there was a very serious outbreak of rabies in 1914 (before Federal control measures were instituted), and as a result more than 1,500 people were bitten and over 50 died. While the disease still exists in scattered localities, the Federal measures undoubtedly are very largely responsible for the prevention of its general spread throughout the western range States.—Weekly News Letter.

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## Rule XII Revised

---

The following letter bears on the revision of Rule XII of the Division of Plant Inspection. The revised rule was adopted by the Board on May 24 and approved by the Governor on May 26, 1920:

April 22, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu.

Gentlemen:—At the suggestion of Commissioner Giffard, Rule XII of this Board concerning the control of insects and other pests in the Territory of Hawaii has been revised and it is believed improved by the recent experience of Entomologist Fullaway in connection with the control of the Australian fern weevil on Hawaii, and the accompanying draft of this revised rule is respectfully submitted for adoption by the Board, subject to the approval of the Attorney General.

Respectfully submitted,

C. S. JUDD,  
Executive Officer.

---

## New Plant Inspection Rule

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The following letter bears on the new rule of the Division of Plant Inspection which was adopted by the Board on May 24, and approved by the Governor on May 26, 1920:

April 17, 1920.

Board of Commissioners of Agriculture and Forestry,  
Honolulu, T. H.

Gentlemen:—For some time past there has been some trouble in regard to potato shipments coming into the Territory. These shipments when infested with scab or eel worms can easily be condemned and returned to the port of debarkation. Despite the fact that a number of shipments have been returned and notice sent to shippers here as well as on the Coast regarding scabby potatoes, yet there seems to be a lack of co-operation on the part of the Coast shipper. I have complained to the Director of Agriculture of California and to the Deputy Horticultural Quarantine Officer and they have both replied that all horticultural produce shipments coming into the San Francisco market do not fall under their jurisdiction, nor have they any control over shipments leaving the Coast for these Islands. They both, however, suggest that the Commissioners take some action regarding the matter and demand inspection certificates at the port of debarkation for horticultural products.

I, therefore, recommend that the Board of Commissioners pass an order that the steamship companies at the various ports on the Pacific Coast be requested to demand an inspection certificate for certain horticultural products that are being shipped to these islands and also that all importers of horticultural products in these islands be notified that such an order has been issued and to take the necessary steps to comply with the order. By such a method we shall be able to keep a better record and will without doubt receive a better grade of produce.

Respectfully yours,

(Sgd.) E. M. EHRHORN,  
Chief Plant Inspector.

---

## The Horn-Fly Problem

---

BY D. T. FULLAWAY, *Entomologist*.

There are a number of flies which utilize the dung of cattle and horses to accomplish their development from ova to mature insects and among them several blood-sucking flies, notably the horn-fly, a serious pest of live stock. This fly is most constant in its attention to stock and appears only to leave the cattle to deposit its eggs, which it does on the fresh droppings. In our equable climate, furthermore, it propagates continuously; there is no winter cessation of activity and depletion of numbers, on the

other hand an uninterrupted progression of cycles produces myriads of flies. It is not unusual to find in one dropping over a thousand immature flies. The effect of the perpetual irritation and annoyance of these flies on the cattle is undoubtedly felt in reduced weight or lower milk production. The reduction and control of the dung-flies therefore constitute one of our most pressing entomological problems, but while considerable attention and study has been given to it hardly any improvement of the situation has resulted. The consensus of opinion among local entomologists seems to be that no improvement can be expected until some means is found of disposing of the manure in which the flies develop so as in some measure to render it unsuited to that purpose. Natural agencies would be most applicable here, particularly on account of the peculiar circumstances of insect propagation in these islands, and of range-cattle conditions, where artificial methods of dung disposal would be beyond consideration. The introduction is proposed of onthophagous or dung-feeding beetles (tumble-bugs, etc.), which have never been successfully tried here, and some with greater temerity have favored bird introduction. The ideas advanced and the propositions emanating from them are supported by facts which can daily be confirmed by very casual observation. It is undeniably true that Honolulu is relatively very free of the house-fly. Connect this circumstance with the relative scarcity of horse-manure, in which it develops, and the rapidity with which horse-manure dries out here, also the activity of the common English sparrow in scattering the droppings. The inference is obvious. It is confidently believed that patient search would at length reveal the agents suited to our needs, and that the desired improvement in the fly situation with respect to our live stock industry only waits on governmental activity.

---

## The Kauri Pine

---

By C. S. JUDD, *Superintendent of Forestry.*

The most promising and widely useful tree for planting in the Hawaiian Islands for the purpose of producing lumber is confidently believed to be the Kauri pine, *Agathis australis*, which although represented here at present only in small numbers, flourishes and grows most satisfactorily. This tree is the monarch of the New Zealand forests and, although it does not rival the giant Sequoias in its extreme height and circumference, it excels them in the intrinsic value of its timber, which possesses a larger number of good qualities than any other pine known to commerce.

The Kauri pine belongs to the cone-bearing family but, unlike the

familiar pines, has foliage which consists of broad leathery green leaves. The trunk has very little taper and it is the columnar-like shape of the bole that gives the Kauri its unprecedented volume of timber. The trunk, which is usually from 80 to 100 feet high and 4 to 12 feet in diameter, has a smooth gray bark which is thick and which on the older trees scales off in large flat flakes. The scales of the cone become woody and closely overlapping form an elegant cone almost spherical and nearly three inches in diameter with a single-winged seed on each scale. The seed of the Kauri does not retain its vitality for a long period and is very difficult to obtain because as soon as the cones mature on the tree, as with the true firs, the scales fall away from the woody axis and the seed is thus scattered in every direction by the wind. If the cones are picked before they are fully ripe it is a difficult matter to obtain mature seed from them.

The genus to which this tree belongs comprises about ten species, distributed through the Malay Archipelago, Fiji, eastern tropical Australia, New Caledonia and New Zealand. The Kauri pine of New Zealand, *Agathis australis*, however, is confined to a limited geographical range in the north half of the North Island, where it is a lowland tree becoming rare at elevations exceeding 1,500 feet, and seldom occupies large areas to the exclusion of other trees. The tree attains its largest dimensions in the mixed forest zone at the higher altitudes and some trees have furnished timbers 60 feet long and 60 inches square. It has been extensively logged in the North Island of New Zealand.

The Kauri pine, contrary to popular thought, is a fast-growing tree, for its average diameter growth is nearly twice that of European forest trees and its height growth more than twice as fast. The average Kauri tree grows one inch in diameter every four and three-quarters years.

All parts of the Kauri pine are exceedingly resinous and this accounts for the remarkable soundness of its timber. The wood is more durable than the best Baltic pine and is regarded as one of the most durable among the timbers of the cone-bearing trees. A Kauri tree can be resin-tapped without interfering with the sap because all the large resin-ducts are in the bark and outside the cambium layer and sap circulation.

The color of the wood varies from yellowish-white to brown in color. The wood, which takes a high polish, is straight-grained, even, compact, firm, clean and silky and, while it is of great strength, it has toughness and elasticity. It is tougher and more elastic than American spruce, and while it is more easily worked than the California redwood, it is without its brittleness.

No other New Zealand timber is capable of being applied to such varied uses. The wood is adapted to all the purposes of the cabinet-maker where a light-colored wood is required. It is excellent for furniture and interior finish, is largely used for posts, rails and shingles, for masts, boats, casks, rims of sieves, and is





Kauri pine at Government Nursery, Honolulu. Age 35 years. Height 66 feet. Diameter 25 inches.



particularly sought for decks of ships, lasting for the latter purpose twice as long as the deal of many other pines. It also gives excellent results in bridge building and is good for the light handles of many implements. In short, the wood of the Kauri combines a larger number of good qualities in a high degree of perfection than any other pine timber in general use.

The tree yields besides, the Kauri gum of commerce, which is usually found as a fossil resin from six to seven feet below the surface of the soil on ground formerly covered by Kauri forest and not infrequently in swamps which covered buried forests. The resin is found in irregularly-shaped pieces varying from a few ounces to 100 pounds in weight. Gum digging is a standing source of employment and the Auckland gum fields are said to have proved far more beneficial to the district than its gold fields. Transparent pieces of the fossil gum are used as a substitute for amber in the manufacture of mouthpieces for pipes and small ornaments and the ordinary kinds are chiefly used as a substitute for copal and mastic in the manufacture of varnishes.

The Kauri pine was introduced to Hawaii about 40 years ago and individual trees have been brought in from time to time since then and may be seen growing in many Honolulu yards and at Lihue, Kauai. The only way in which additional Kauri pine seedlings have been available for planting in Hawaii has been to pick up the fresh seed dropped from these scattered trees or to lift from the ground the young seedlings which have sprouted from seed thus dropped. By the former method several thousand Kauri pine seedlings were secured about a year ago from one tree in the Nuuanu Avenue grounds of Mrs. Mary E. Foster in Honolulu and have been planted out in various localities. Over an acre in the Waiahole Forest Reserve, Oahu, has been planted out with these seedlings spaced 10 by 10 feet apart to test their growth for timber under close growing conditions.

Experiments are being conducted at the Government Nursery in raising more of these trees from seed by the introduction of fresh seed from New Zealand, so that more of the seedlings will be available for general planting.

For those in these islands who desire to plant in the moderately moist regions a fairly rapidly growing tree whose timber is classed very high, the Kauri pine is strongly recommended.

---

## Division of Forestry

---

Honolulu, May 14, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu.

Gentlemen:—I respectfully submit the following routine report of the Division of Forestry for the month of April, 1920:

### TREE PLANTING.

The total plantings during the month in three localities on Oahu amounted to 3,947 trees which were set out as follows: At Makiki 185 koa trees were planted in an open valley on Tantalus to shade out the Hilo grass which has crept in; at Mikilua 2,575 red gum and 772 bloodwood trees were planted out on barren, deforested slopes; and at Waiahole, largely in the nature of an experiment, 70 kauri pines, 200 Norfolk Island pines, 37 narra, 14 Arabian teak, 7 bastard sandalwood (naio), 2 red pine (rimu of New Zealand), and 85 lime trees were set out.

Activities at the several nurseries are reported by the Forest Nurseryman. A start has been made in clearing the newly acquired land next to the animal quarantine station in Hilo, to which it is proposed to move the sub-nursery now at the Catholic Boys' School.

### FOREST FENCING.

Arrangements were made during the month with Y. Tanaka to construct a fence over two and one-half miles along the Volcano Road on Hawaii, this Division to furnish the wire and staples and he to supply the posts and erect the fence. This fence will protect a large part of Section C of the Olaa Forest Park Reserve which is an asset to the road leading to the Volcano.

### FOREST RESERVE MODIFICATIONS.

A large part of the month was spent in the office compiling reports on needed modifications of forest reserve boundaries which had accumulated. These have already been presented and have received your attention.

### KAUAI TRIP.

From April 1—3, I was on Kauai at the direction of the Governor with Mr. H. M. Albright, Field Assistant to the Director of the National Park Service, and conducted him to Waimea Canyon and Kalalau Valley. He was delighted with the scenic aspects of these two places, but left with the opinion that a National Park is not a present necessary there, in view of the arrangements, made by the Board and the County of Kauai, giving people the opportunity to visit the canyon.

### FIELD TRIP.

One day was spent in marking algaroba trees for thinning at Lualualei under a Land Office license and another in an inspection of the Olympus-Konahuanui trail. On the latter, no new land slides were observed, but the Hilo grass is becoming more abundant even to the extent of a patch 10 feet square on the top of Mt. Olympus. This, in my opinion, makes the adoption of proposed Rule V of this Division more urgent.

Respectfully submitted,

C. S. JUDD,  
Superintendent of Forestry.



## REPORT OF FOREST NURSERYMAN.

Honolulu, May 10, 1920.

Superintendent of Forestry, Honolulu, T. H.

Sir:—I herewith submit the following report of the work done during the month of April, 1920:

## NURSERY.

## Distribution of Plants—

	Pot- Grown.	Transplant Boxes.	Total.
Sold . . . . .	97	100	197
Gratis . . . . .	745	605	1,350
Total . . . . .	<u>842</u>	<u>705</u>	<u>1,547</u>

## COLLECTIONS.

## Government Realizations—

Collections on account of plants sold . . . . .	\$ 2.80
Rent of office, Nursery grounds . . . . .	35.00

Total . . . . . \$37.80

## Preservation of Forest Reserves—

Fee for camp site No. 30, Jan. 1 to Dec. 31, 1920, Kokee Camp, Na Pali Kona Forest Reserve, Kauai . . . . .	\$ 9.00
--	---------

## Animal Industry Revolving Fund—

Hemorrhagic septicemia vaccine (Harold Rice, Paia, Maui) . . . . .	\$17.10
--	---------

## PLANTATION COMPANIES AND OTHER CORPORATIONS.

A total of 1,000 trees in transplant boxes were distributed to plantation companies and other corporations during the past month.

## MAKIKI STATION.

The work at this station has been principally routine. We are increasing our stock and preparing for the coming planting season.

## HONOLULU WATERSHED PLANTING.

A total of 185 koa trees were planted during the month on land adjoining the Schmidt estate at the back of Sugar Loaf Hill.

## ADVICE AND ASSISTANCE.

The writer has been called upon during the month to make the following number of calls and otherwise give advice and assistance as follows:

Calls made . . . . .	6
Advice given by telephone . . . . .	7
Advice given to people calling . . . . .	9

## REPORTS FROM SUB-NURSERIES.

## Hawaii Nursery, Hilo.

Brother Newell reports that he distributed 307 trees in transplant boxes during the month.

## Maui Nursery, Haiku.

Mr. James Lindsay reports that he has distributed 150 trees during the month.

## KAUAI NURSERY, KALAHEO.

Mr. Joe Rita, Jr., reports that he has on file orders for 3,000 trees which he is propagating and will deliver them when ready.

Respectfully submitted,

DAVID HAUGHS,  
Forest Nurseryman.

## Division of Entomology

Honolulu, May 10, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—During the month of April, the insectary handled 12,800 pupae of the melon fly from which were bred 2,387 females and 2,484 males (*Opius fletcheri*).

The distribution of parasites was as follows:

## MELON FLY PARASITE.

*Opius fletcheri*.

	Females.	Males.
Oahu:		
Kalakaua Avenue .....	300	350
Moliili .....	250	250
Waialua .....	150	150
Kaimuki .....	400	400
Pearl Harbor .....	300	300

## FRUIT FLY PARASITES.

*Diachasma fullawayi*.

Oahu:		
Nuuanu Avenue .....	125	125
Kaimuki .....	20	20

*Opius humilis*.

Oahu:		
Nuuanu Avenue .....	50	50
Kaimuki .....	100	100

**Dirhinus giffardi.**

Oahu:		
Nuuanu . . . . .	200	
Kaimuki . . . . .	150	

**Diachasma tryoni.**

Oahu:		
Nuuanu . . . . .	250	250
Kaimuki . . . . .	100	100

**Tetrastichus giffardianus.**

Oahu:		
Nuuanu . . . . .	1400	
Kaimuki . . . . .	1200	

**Galesus silvestri.**

Oahu:		
Nuuanu . . . . .	300	
Kaimuki . . . . .	100	

**DUNG FLY PARASITE.****Spalangia cameroni.**

Hawaii:		
Keaau . . . . .	500	

The Entomologist returned to the Island of Hawaii on the 22nd of the month to inspect the fern weevil eradication work at 29 Miles, Olaa. A careful examination of the ferns on the boundary of the infested area was made in company with Mr. Swezey, Chief Entomologist of the H. S. P. A., and on finding stragglers occupying two sections of the borders (Tom Cook and Carlsmith lots), the fern growth at these points was cleared to a depth of thirty-five to fifty feet, burned, and the ground scarified and sprayed with arsenite of soda. This work occupied two weeks. While it was progressing the entomologist personally applied the sodium arsenite spray to all ferns that could be found in the koa park, Deyo and Bowman lots and on the lava tube section of the Shipman property. The Kennedy and Shipman pastures were also gone over and the ferns on them hand-picked as far as possible. The weevils could not be found anywhere on the borders of the infested area, except as above noted, and on the interior area surprisingly few ferns could be found in the koa park or Kennedy pasture and no weevil was detected in the latter. There were still some ferns and weevils in the Shipman pasture and Mr. English has been notified to hand pick these ferns more thoroughly. Weevils were found in the lava tubes, but no indication of spreading was observed. They were also found in the back of the Deyo and Bowman lots, but the spraying and burning which will be done there will probably check them completely. Mr. English had practically completed the burning of the fern stumps piled on his property when the entomologist returned to Honolulu on May 10th, and has been requested to do as much spraying as possible on his lot to destroy the stragglers. Orders were also left with a Japanese workman in the neighborhood to continue spraying if it was found necessary in order to destroy all neglected or sprouting ferns throughout the month of May. This work is to be done under the supervision of Mr. Mackenzie.

Respectfully submitted,

D. T. FULLAWAY,  
Entomologist.

## Division of Plant Inspection

Honolulu, April 30, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—I respectfully submit my report of the work carried on by the Division of Plant Inspection for the month of April, 1920, as follows:

During the month 77 vessels arrived at the Port of Honolulu, 19 of which carried vegetable matter and 16 vessels came through the Panama Canal Zone. The following disposal was made of the various shipments:

Passed as free from pests.....	877 lots	18,336 pkgs.
Fumigated.....	57 “	57 “
Burned.....	73 “	73 “
Returned.....	1 “	100 “
Total Inspected.....	1,008 lots	18,566 pkgs.

Of these shipments 17,780 packages arrived as freight, 217 packages as mail and 566 packages as baggage.

### RICE AND BEAN SHIPMENTS.

During the month 26,146 bags of rice from Japan, 600 mats of rice from China and 2,757 bags of beans from Japan arrived and were found free from pests.

### PESTS INTERCEPTED.

Approximately 6,514 pieces of baggage belonging to immigrants from foreign countries were examined, from which 26 lots of fruit and 32 lots of vegetables were seized and destroyed.

On April 1, per Tenyo Maru, a package of seeds found in the mail from Japan was fumigated precautionarily. A package of chestnuts from Japan, also in the mail, was fumigated on account of weevils.

On April 5, per Korea Maru, a package of seeds from Cuba for Dr. Lyon, and a package of seeds from Chile for the Board of Agriculture, both in the mail, were fumigated precautionarily.

On April 8, per Anyo Maru, 5 packages of plants in the possession of immigrants from Japan were seized and burned, being prohibited. Also a package of rice paddy in the mail from Japan was burned. Two packages of tree seeds in the mail for the U. S. Experiment Station from Java were fumigated on account of decay mites.

On April 11, per Siberia Maru, a package of plants and a package of bamboo shoots found in the baggage of an immigrant from Japan was seized and destroyed by burning.

On April 13, per Nanking from China, a package of herbs found in the mail infested with moth larvae was seized and burned. Under even date, per Wilhelmina, a plant in the baggage of a passenger from California was fumigated with HCN, being infested with aphids. Forty orchids, also in the possession of a passenger, were fumigated on account of mealy bug. One hundred sacks of potatoes consigned to the California Feed Company from California were returned, being badly infested with potato scab.

On April 14, per Ecuador, a package of seeds in the mail for the U. S. Experiment Station from Java was fumigated precautionarily. Three



packages of seeds in the baggage of immigrants from Manila were seized and destroyed.

On April 21, per Shinyo Maru, a package of sugar cane and a plant found in the baggage of immigrants from China were seized and destroyed by burning. A package of bamboo shoots in the baggage of an immigrant from Japan was also burned, as all bamboo in the raw and manufactured state is prohibited. In the mail, a package of beans from Japan, 3 packages of vegetable seeds from Manila and 2 packages of pili nuts from Manila were all fumigated precautionarily. Two packages of tree seeds from Manila in the mail were seized and destroyed as contraband.

On April 23, per Tenyo Maru, a package of algaroba beans in the mail from the U. S. Dept. of Agriculture for the U. S. Experiment Station was fumigated precautionarily.

On April 27, per Matsonia, two lots of pineapple suckers arrived in the mail for Dr. Lyon, H. S. P. A. One lot from Guatemala, through the Bureau of Plant Introduction, was found infested with the pineapple mite. These were fumigated with double strength HCN and the plants are now held in quarantine. The other lot was from Mexico through the Bureau of Plant Industry. Two of the suckers were found infested with the pineapple weevil and these were immediately burned. The rest were fumigated, being found infested with mealy bug, and are now held in quarantine.

#### HILO INSPECTION.

Brother M. Newell, Inspector at Hilo, reports the arrival of 7 steamers at the Port of Hilo. Six carried vegetable matter consisting of 127 lots and 2,186 parcels, all clean with the exception of 3 sacks of turnips which, having arrived in an unclean condition, were washed before delivery. Twenty-five hundred bags rice and 187 bags beans arrived from Japan in 15 and 7 lots respectively, all clean.

#### KAHULUI INSPECTION.

Mr. Will J. Cooper, Inspector at Kahului, reports the arrival of 8 vessels at the Port of Kahului. Two carried vegetable matter consisting of 9 lots and 478 parcels, all passed.

#### INTER-ISLAND INSPECTION.

Fifty-eight steamers plying between Honolulu and the other island ports were attended and the following shipments passed as free from pests:

Taro.....	444 bags
Taro tops .....	20 "
Vegetables.....	305 pkgs.
Fruit.....	149 "
Plants.....	59 "
Seeds.....	18 "
Pineapple shoots.....	2,837 bags
Sugar cane (H. S. P. A.).....	16 cases

Total passed..... 3,848 pkgs.

Thirty-nine packages of plants were refused shipment on account of infestation, undesirable soil and not complying with the regulations.

Respectfully submitted,

E. M. EHRHORN,  
Chief Plant Inspector.

## Division of Animal Industry

---

Honolulu, May 12, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu.

Gentlemen:—I beg to submit the following report of the work of this Division for the month of April:

### TUBERCULOSIS CONTROL.

The total number of cattle tested during the past month was 562. Of this number 6, or 1.06% were condemned and slaughtered, post mortem examinations proving the presence of tuberculosis.

The subject of the testing of Mr. Perry's cattle has been brought up but no satisfactory results have been reached as yet. After the last Board meeting, May 4, Mr. Perry was notified by phone to have his cattle ready for testing on May 10. He replied that he wanted to discuss the matter further with the President of the Board and would let me know what had been decided. Since then nothing has been heard from him.

Some decision should be reached in this matter. We have now reached the lowest percentage of tuberculosis since organized control work on this disease was inaugurated just ten years ago this month. We have come to the point where we can concentrate our efforts upon the few places where tuberculosis exists to any extent. Many of the dairies here are clean and have been so for some time, consequently it is not necessary to test them so frequently. They are being inspected regularly and the addition of new cows noted, which cows are tested immediately.

We have laws preventing the introduction of tuberculosis from the mainland; we have laws preventing its introduction to the Island of Oahu from other islands of the group; we have the lowest percentage of tuberculosis so far recorded. It but needs now the hearty co-operation of every stock owner of Oahu to make the complete eradication of this disease a fact.

### CONTAGIOUS ABORTION OF CATTLE.

The treatment of cattle affected with this disease is still being continued. One more Honolulu dairy has been added to the list of those known to be definitely infected. With the amount of bacterins and serum on hand we may reasonably expect to keep the losses from this disease at a minimum. It may be necessary later to promulgate rules regulating the transfer of animals from infected dairies to dairies known to be clean.

### HEMORRHAGIC SEPTICEMIA OF SWINE.

Several outbreaks of this disease among swine have occurred recently. In one rather extensive outbreak nearly a hundred animals of all ages were lost before any report was made to this office. Since vaccination, however, the losses have been confined to the death of four three weeks' old pigs. In the other outbreaks the losses have been reduced correspondingly.

## IMPORTATION OF LIVE STOCK.

Of the different classes of live stock imported during the past month special attention may be called to the Angus and Holstein cattle brought down for the Grove Farm, Maui. They were all high class animals of a kind of which this Territory is very much in need.

Respectfully submitted,

L. N. CASE,  
Asst. Territorial Veterinarian.

Honolulu, May 6, 1920.

## REPORT OF ASISTANT VETERINARIAN.

Dr. V. A. Norgaard, Chief, Division of Animal Industry,  
Bureau of Agriculture and Forestry, Honolulu.

Dear Sir:—I beg to submit the following report for the month of April:

## TUBERCULOSIS CONTROL.

The following cattle were tested:

	Tested.	Passed.	Con- demned.
Alexander & Baldwin .....	32	32	0
Geo. P. Cooke .....	1	0	1
Chas. Lucas .....	1	1	0
O. R. & L. Co. ....	511	507	4
M. Freitas .....	6	6	0
John Waterhouse .....	4	3	1
C. Brewer & Co. ....	2	2	0
Pedro Dias .....	2	2	0
M. A. Salado .....	1	1	0
M. Robinson .....	2	2	0

From the above list it will be seen that a total of 562 head of cattle were tested, out of which number 556 were passed, and 6 condemned and branded.

Post-mortem examinations were held at the local abattoirs on previously condemned animals, positive lesions of tuberculosis being present in every case.

## CONTAGIOUS ABORTIONS AMONG CATTLE.

Positive evidence of contagious abortion among the cattle of several dairies has been obtained and at the present time 17 head of fine dairy cows are being treated with contagious abortion bacterins, of which we have a sufficient amount on hand.

## CONTAGIOUS EPITHELIOMA.

Fifty-four chickens were injected with vaccine for this disease and 100 cc. of vaccine distributed to different chicken raisers. So far we have had comparatively few outbreaks of this disease reported this year.

## HEMORRHAGIC SEPTICEMIA OF SWINE.

A small outbreak of this disease appeared in a herd of pure-bred Berkshires. Post-mortem examination established the nature of the disease and vaccine was administered at once with the result that the loss was confined to a few three or four weeks' old pigs.

## IMPORTATION OF LIVE STOCK.

Eighty-six vessels entering this port were boarded and inspected for live stock. Out of this number the following were found to carry live stock for this Territory:

S. S. Tenyo Maru, Orient: 1 chow dog, F. E. Richardson.

S. S. Eastern Gale, Seattle: 5 Angus bulls, 4 Angus heifers, 20 Holstein cows, Grove Farm, Maui.

S. S. Nile, Orient: 1 chow dog, Lieut. Moore.

S. S. Waukegan, London, England: 1 Boston bull terrier, A. E. Downing.

S. S. Manoa, San Francisco: 32 crates poultry.

S. S. Siberia Maru, Sydney: 2 dogs, George C. Munroe.

S. S. Lurline, San Francisco: 2 Hereford bulls, C. Brewer & Co.; 23 mules, Hawaiian Pineapple Co.; 25 crates poultry: 23 mules, 18 horses, F. H. Locey, Maui.

S. S. Matsonia, San Francisco: 1 Boston bull terrier, M. M. Jones.

Respectfully submitted,

L. N. CASE,  
Asst. Territorial Veterinarian.

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## By Authority

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## TERRITORY OF HAWAII.

## BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY.

## RULE XII.

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### RULE AND REGULATION OF THE BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY CONCERNING THE CONTROL OF INSECTS AND PLANT DISEASES IN THE TERRITORY OF HAWAII.

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The Board of Commissioners of Agriculture and Forestry of the Territory of Hawaii hereby amends Rule XII of the Board approved December 30, 1911, concerning the control or eradication of injurious insects or other injurious animals or dangerous plant diseases, or insects, or other animals or plant diseases likely to become injurious to trees, plants, or other vegetation of value and the fruit thereof in the Territory of Hawaii, so as to read as follows:

Section 1. All officers, inspectors or other duly appointed agents of the Board of Agriculture and Forestry are hereby authorized and empowered to enter public or private premises, excepting private houses,



at all reasonable times to search for injurious insects or other injurious animals or dangerous plant diseases, and to carry out the orders of the Board in relation thereto and they shall not be holden guilty of any misdemeanor by so doing nor shall they be personally liable in damages except for acts beyond the scope of their authority or due to their own negligence.

Section 2. Whenever any injurious insect or other injurious animal or dangerous plant disease is discovered on any premises, the officer, inspector or other duly appointed agent of the Board charged with that duty, shall notify the owner of the same and prescribe a method or methods of controlling or eradicating the said insect or other animal or plant disease, and the owner, upon receipt of such notification shall do and perform the prescription of said officer, inspector or other duly authorized agent, relative to its control or eradication, or upon failure to so do and perform within a reasonable time after notification, the said officer, inspector or duly authorized agent may and is hereby authorized and empowered to enter upon said premises to do and perform the same or cause the same to be done and performed.

Section 3. All officers, inspectors and other duly authorized agents of the Board are hereby authorized and empowered to seize and destroy any soil, nursery stock, tree, sugar cane, shrub, plant, flower, vine, cutting, graft, scion, bud, seed, root, fruit pit, fruit, vegetable, leaf, nut or other vegetable growth, or other substances and any box, barrel, package or packing material or containers in which said articles or any of them have been transported or contained, which is or may be infected or infested with or likely to assist in the transmission or dissemination of any injurious insect or insects or injurious animal or animals or dangerous plant diseases, or diseases found in any shipment in any part of the Territory.

Section 4. Any person, firm or corporation violating the above rule shall be guilty of a misdemeanor and upon conviction thereof shall be punished by a fine not to exceed Five Hundred Dollars (\$500), as provided by Section 529 of the Revised Laws of Hawaii of 1915.

Section 5. This rule, as amended, shall take effect upon its approval by the Governor.

Approved this 26th day of May, 1920.

C. J. McCARTHY,  
Governor of Hawaii.

Honolulu, T. H.

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## TERRITORY OF HAWAII.

### BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY.

#### AMENDMENT TO RULE XX—DIVISION OF PLANT INSPECTION.

The Board of Commissioners of Agriculture and Forestry of the Territory of Hawaii hereby amends Section 5 of Rule XX of the Division of Plant Inspection, approved May 26, 1919, concerning the control of insect pests and plant diseases in the Territory of Hawaii, so as to read as follows:

Section 5. Plants and trees for forestry, horticultural and agricultural purposes may be shipped in reasonable quantities from the Island of Oahu to any other island in the Territory under a special permit, when said plants and trees have been grown in sterilized soil under conditions and for a period satisfactory to the Chief Plant Inspector, or have been transplanted to sterilized soil prior to shipment and properly housed to

prevent fresh contamination, provided that all the operations in question have been carried out at the expense of the shipper under the direction of, and subject to the approval of the Chief Plant Inspector, and provided that said plants and soils are apparently free from infestation or infection which bears potential danger to the agriculture or plant life of the other islands.

This amendment shall take effect upon its approval by the Governor.

Approved this 1st day of June, 1920.

C. J. McCARTHY,  
Governor of Hawaii.

Honolulu, T. H.

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## TERRITORY OF HAWAII:

### BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY.

#### RULE XXII—DIVISION OF PLANT INSPECTION.

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#### RULE AND REGULATION OF THE BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY OF THE TERRITORY OF HAWAII CONCERNING THE IMPORTATION INTO THE TERRI- TORY OF HAWAII OF POTATOES AND APPLES FROM PACIFIC COAST PORTS.

---

The Board of Commissioners of Agriculture and Forestry of the Territory of Hawaii hereby makes the following rules and regulations for the purpose of preventing the introduction into this Territory from Pacific Coast ports of the United States of insect pests and plant diseases which may be carried on potatoes and apples:

Section 1. No shipment of potatoes or apples in the natural or raw state, whether by freight or express, shall be permitted to be imported into the Territory of Hawaii from ports on the Pacific Coast of the United States of America unless such shipment is accompanied by a certificate signed by a qualified officer of the city, county, or state from which the shipment is made, that the shipment has been inspected by him and is shipped free from insect pests and plant diseases.

Section 2. The certificate of inspection required by Section 1, must give the name of the shipper, the name of the consignee and the number of sacks, crates or boxes contained in each shipment if potatoes or apples, and one copy must be attached to a sack, crate or box in each shipment and another copy delivered to the Chief Plant Inspector or his assistant by the person, firm or corporation transporting such potatoes or apples, upon the arrival of the shipment in the Territory.

Section 3. No person, firm or corporation engaged in the transportation of freight or express packages between the said Pacific Coast ports and the ports of Hawaii, shall land or cause or allow to be landed in any port or on any wharf in the Territory of Hawaii, any such shipment of potatoes or apples in the natural or raw state without first delivering the certificate of inspection, provided for in Section 2, hereof, to the said Chief Plant Inspector or his assistant.

Section 4. Any shipment of potatoes or apples arriving in the Territory unaccompanied by said certificate of inspection will be returned to the consignor at his own expense.

Section 5. Any person, firm or corporation violating the above rule shall be guilty of a misdemeanor and upon conviction thereof shall be

punished by a fine not to exceed Five Hundred Dollars (\$500.00) as provided by Section 529 of the Revised Laws of Hawaii of 1915.

Section 6. This rule shall take effect on July 1, 1920.

Approved this 26th day of May, 1920.

C. J. McCARTHY,  
Governor of Hawaii.

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### FOREST RESERVE HEARING.

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Notice is hereby given that under the provisions of Chapter 37, R. L. H., 1915, a public hearing will be held by the Governor of Hawaii and the Board of Commissioners of Agriculture and Forestry on Wednesday, the 9th day of June, 1920, at 2 o'clock p. m., in the office of said Board at the Government Nursery, King Street, Honolulu, to consider the defining of the limits and the setting apart as a forest reserve of certain government land, the modification of boundaries, and the withdrawal of land from forest reserves, more particularly as follows:

1. Island of Hawaii, District of Puna, Land of Olaa, 30,000 square feet addition to Section C Olaa Forest Park Reserve.

2. Island of Hawaii, District of Puna, Land of Olaa, withdrawal of 81.7 acres from the Olaa Forest Reserve.

3. Island of Oahu, District of Honolulu, withdrawal of 3,230 square feet from Honolulu Watershed Forest Reserve on Tantalus Heights.

4. Island of Kauai, District of Puna, modification of lower boundary of Lihue-Koloa Forest Reserve, net reduction about 658 acres.

5. Island of Kauai, District of Kawaihau, modification of boundaries of Kealia Forest Reserve, net reduction about 885 acres.

Maps and description of the said lands are on file in the office of the Superintendent of Forestry where they are open to the inspection of the public. At the said time and place all persons who so desire will be given full opportunity to be heard upon the subject matter of this notice and to present evidence and arguments in person, by proxy, or by letter, either for or against the setting apart of said lands as forest reserves or the elimination of said lands from existing reserves.

C. J. McCARTHY,  
Governor of Hawaii.

The Capitol, Honolulu, T. H.,  
May 24, 1920.

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### NOTICE OF PUBLIC HEARING.

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Notice is hereby given that a public hearing will be held by the Board of Commissioners of Agriculture and Forestry at the office of said Board at the Government Nursery, King Street, Honolulu, at 2:30 o'clock p. m., on Wednesday, June 9, 1920, to consider arguments for or against the adoption by the Board of Rule V of the Division of Forestry which proposes, in the interest of forest protection, to prohibit tramping on the upper mountain slopes of the Palolo and Manoa watersheds in the District of Honolulu, Island of Oahu.

C. S. JUDD,  
Executive Officer.

Honolulu, June 3, 1920.

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# THE HAWAIIAN FORESTER AND AGRICULTURIST

JULY, 1920

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# The Hawaiian Forester and Agriculturist

A Monthly Magazine of Forestry,  
Entomology, Animal Industry  
and Agriculture

Issued under the direction of the Board of  
of Commissioners of Agriculture and  
Forestry, Territory of Hawaii.



Address all communications to

**DANIEL LOGAN**

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# Board of Agriculture and Forestry

## DIVISION OF FORESTRY.

### FOREST AND ORNAMENTAL TREE SEEDLINGS FOR SALE AT GOVERNMENT NURSERIES.

The Division of Forestry maintains the following nurseries on the several islands from which seedlings of the common forest and ornamental trees may be obtained at cost:

KALAHEO, KAUAI. Nursery at Papapaholahola Spring Reserve in charge of Joe Rita, Jr., Kalaheo.

Trees for planting on Windward Kauai may be obtained from the Kapaa School by applying to Mr. Geo. S. Raymond, Principal.

HONOLULU, OAHU. Government Nursery, King Street, in charge of Forest Nurseryman David Haughs, Box 207, Honolulu. Fresh tree seed may also be obtained from this nursery.

HAIKU, MAUI. Nursery in charge of Forest Ranger James Lindsay, Haiku.

HILO, HAWAII. Nursery at the Boys' Catholic School in charge of Bro. Matthias Newell, Hilo.

PRICES: Plants in seed boxes \$1.00 per 1000. Transplants in boxes 1c each. Transplants in pots 2½c each.

C. S. JUDD,  
Superintendent of Forestry.

## DIVISION OF ENTOMOLOGY.

To give information about insects free of charge is one of the duties of this Division, and Hawaiian readers are hereby invited to make inquiry in person and by mail. In order to be able to advise intelligently or send the right kind of useful insects for relief, we like and sometimes it is indispensable for us to see the insects suspected or caught in the act, also specimens of the injury. In a tin with a hole or two, or a wooden box, specimens may be mailed by parcels post. When specimens are not accompanied by letter, always write your name and address in the upper left-hand corner of the package. Address all communications, DIVISION OF ENTOMOLOGY, P. O. BOX 207, HONOLULU, HAWAII.

D. T. FULLAWAY,  
Entomologist.

## PUBLICATIONS FOR DISTRIBUTION.

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# THE HAWAIIAN FORESTER AND AGRICULTURIST

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VOL. XVII.

HONOLULU, JULY, 1920.

No. 7

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The present issue of the Forester is devoted largely to information concerning forest reserve changes.

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Mr. Charles J. Kraebel, Assistant Superintendent of Forestry, arrived from Portland, Oregon, on June 22, and at once undertook his new duties in the Division of Forestry.

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The epidemic of hemorrhagic septicemia in Kau was brought to an early conclusion by the vaccination of 6306 head of cattle. The total deaths from the disease were confined to 120 head.

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The fire menace still exists in certain localities of the Territory on account of the dry spell, and all those who go into or near the forest are cautioned to use the greatest of care and not to start any fires.

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Mr. L. A. Whitney, the new Assistant Plant Quarantine Inspector and Laboratory Assistant in the Division of Plant Inspection, arrived from San Francisco on June 15, and immediately assumed his new duties.

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A considerable amount of Congressional vegetable seed is still available for distribution at the Government Nursery, King Street, and will be mailed out free of charge to those who apply to Mr. David Haughs, Box 207, Honolulu.

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A public hearing was held on June 9 at the Government Nursery, Honolulu, to consider the closing of the Olympus-Kona-huanui trail in the interest of forest protection on the Honolulu Watershed and arguments were presented for and against the adoption of Rule 5 of the Division of Forestry. The matter is still under consideration.

AUG 9 1920

## Forest Reserve Changes

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On June 9, 1920, there was held a public hearing at the Government Nursery to consider certain changes in five forest reserves, which had received the approval of the Commissioners on May 4 and 24. No one appeared to object to these changes and on June 21 the Governor signed the proclamations which appear in this issue.

These changes were as follows:

1. Addition of 30,000 sq. ft. of land along the Volcano Road acquired by exchange from Fred G. Snow, to Sec. C. of the Olaa Forest Park Reserve, Hawaii.

2. Withdrawal of 83.10 acres of agricultural land from the Olaa Forest Reserve, Hawaii, near 24 Miles so that it may be leased.

3. Withdrawal of 3230 sq. ft. of land on Tantalus Heights within the Honolulu Watershed Forest Reserve, Oahu, desired by the Land Commissioner for exchange purposes.

4. Change in lower boundary of Lihue-Koloa Forest Reserve, Kauai, to release agricultural land and conform to established fence line across lands of Hanamaulu and Wailua. The net reduction in area amounts to 658 acres.

5. Modification of boundary of Kealia Forest Reserve, Kauai, to release agricultural land and make certain lines more definite. The net reduction in area amounts to 885 acres.

Copies of reports of the Superintendent of Forestry on these projects are printed in this issue.

With these changes the present total area in the 47 forest reserves now amounts to 817,114 acres. Of this 557,344 acres or 68% is land belonging to the Territory.

## Forest Reserve Addition

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OLAA FOREST PARK RESERVE.

Honolulu, April 26, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu.

Gentlemen:—In exchange for 30,000 square feet of land in Sec. C. of the Olaa Forest Park Reserve, District of Puna, Island of Hawaii, which was withdrawn from this reserve by proclamation of the Governor signed December 31, 1918, Mr. F. G. Snow has deeded to the Territory an equal area in the immediate vicinity on the Volcano Road near 22 Miles which is covered with a heavier growth of tree ferns and ohia forest.

The area is already fenced and protected from stock and since it lies between two adjacent pieces of forest reserve land it should properly be added to this reserve system.

For this reason I recommend that the 30,000 square feet of land near 22 Miles, Olaa, Puna, Hawaii, deeded to the Territory by Mr. F. G. Snow be added to and made a part of Sec. C. of the Olaa Forest Park Reserve and that the Governor be requested to take the necessary steps to accomplish this.

Respectfully submitted,

C. S. JUDD,  
Superintendent of Forestry.

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## Forest Reserve Withdrawals

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### OLAA FOREST RESERVE.

Honolulu, April 26, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu.

Gentlemen:—Subsequent to the setting apart of the Olaa Forest Reserve in the District of Puna, Island of Hawaii, on December 31, 1918, I had occasion to run out some lines with a government surveyor near 24 Miles on the Volcano Road, and it was discovered that a portion of the reserve, amounting to 81.7 acres, consisted of agricultural land on which potatoes and corn were being raised.

All of the 20,030 acres of the Olaa Forest Reserve has been laid out in the past into lots with the idea that it would be homesteaded but, after repeated failures, bona fide homesteaders have given up the attempt to cultivate the land, and it was to prevent further forest destruction by grazing in this vast forest under lease that it was set apart as a reserve.

The small area in question, shown on the accompanying blue-print map, is probably the only piece of land in the reserve which is more valuable for agriculture than for forest purposes at the present time, and its inclusion in the reserve was not known until this later survey was made.

Since the 81.7 acres is strictly agricultural land and is now under cultivation, it seems best to withdraw it from the reserve so that it may be leased by the Land Office in the usual lawful manner. If this is done, the applicant for the lease has agreed to fence the entire boundaries of this land.

For this reason I recommend that the Board approve the with-

drawal of the 81.17 acres from the Olaa Forest Reserve, and that the Governor be requested to take the necessary steps toward this end.

Respectfully submitted,

C. S. JUDD,  
Superintendent of Forestry.

#### HONOLULU WATERSHED RESERVE.

Honolulu, April 28, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu.

Gentlemen:—As per the accompanying letter of March 13, 1920, the Commissioner of Public Lands has requested that a small parcel of land consisting of 3230 square feet adjacent to Lot 14 on Tantalus within the Honolulu Watershed Forest Reserve, District of Honolulu, City and County of Honolulu, and shown on the accompanying sketch map be withdrawn from the said reserve and returned to his jurisdiction so that it may be exchanged for a parcel of land for "Fern Park" in Kapalama, Honolulu.

Upon investigation, I find that the only suitable building site for Lot 14, from which any view could be obtained, is the area in question and that buildings were constructed on the area long before it and the surrounding lands were included in the forest reserve. The small area has no native forest upon it and I see no particular objection to legalizing the occupancy of the land by returning it to the jurisdiction of the Commissioner of Public Lands.

There is a road leading down to the area from mauka, and in order to continue a trail right of way the Parke Estate has agreed, if this withdrawal is made, to construct a trail under my supervision along and below the northwest side of this land to connect up with the government land on the ridge makai of the piece. In this way travel up the ridge will not be interrupted. For the above reason I recommend that the Board approve the withdrawal of the 3230 acres from the Honolulu Watershed Forest Reserve and that the Governor be requested to take the necessary further action.

Respectfully submitted,

C. S. JUDD,  
Superintendent of Forestry.



(COPY)

Honolulu, T. H., March 13, 1920.

C. S. Judd, Esq.,  
Superintendent of Forestry,  
Honolulu, T. H.

Dear Sir:—Enclosed herewith, permit me to hand you description of survey and blue print showing 3230 square feet of land on Tantalus, Honolulu, Oahu, within the Forest Reserve, which is now and for some time past has been occupied by the Annie S. Parke Estate.

It is desired, if possible, to have this area withdrawn from the Forest Reserve, in order that the same may be exchanged for a parcel of land required for "Fern Park," Kapalama, Honolulu, Oahu.

It seems that several years ago when the buildings were erected on this Tantalus property, the then owner of the Parke lot encroached upon the Forest Reserve, with the result that the building, outhouse and tanks were erected on Government property.

I would, therefore, respectfully request that you take this matter up with the Board of Agriculture and Forestry, with the idea of having this area withdrawn from the Reserve.

Very truly yours,

(Signed)

C. T. BAILEY,  
Commissioner of Public Lands.

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## Change of Boundary

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### AMENDMENT TO LOWER BOUNDARY OF LIHUE-KOLOA FOREST RESERVE, KAUAI.

Board of Commissioners of Agriculture and Forestry, Honolulu.

Gentlemen:—Soon after taking office in 1915, my predecessor wrote me and pointed out the advisability of making a change in the official boundary line of the Lihue-Koloa Forest Reserve, District of Puna, Island of Kauai, so as to conform with the new fence built across the land of Wailua in 1914. This new fence was constructed somewhat mauka of the original forest reserve boundary, proclaimed on June 5, 1909, which runs straight across the land of Wailua from near Hanahanapuni Hill to North Olohena, for the reason that it could be more conveniently built on this new line and also because the section between the actual

reserve boundary and the new fence was more suitable for other than forest purposes, it consisting of a number of open flat topped ridges without tree growth, which will be needed either for homesteading or grazing.

As time has allowed it, I have examined the areas and had the government surveyor run out the proposed new line not only across this portion of the government land of Wailua, but across the remainder and across the private land of Hanamaulu, which conforms with the forest fence built across these lands some years ago by the Lihue Plantation. This is shown on the accompanying map.

The present forest fence, which is in stock-proof condition, and is maintained by the Lihue Plantation, is the logical location for the official forest reserve line across these lands.

The proposed amendment to the description of the lower boundary line substitutes eight new courses for courses Nos. 28-34 contained in the original proclamation of June 5, 1909, and lessens the area of Hanamaulu in the forest reserve by 218.80 acres, and the area of Wailua in the forest reserve by 433.85, or a total reduction of 652.65 acres.

Since the land affected by the amended description consists of open, treeless areas, which are more valuable for other than forest purposes, and the amended description conforms to a permanently established fence, I recommend that the lower boundary of the Lihue-Koloa Forest Reserve be modified as shown above by substituting the eight new courses for courses 28 to 34 of the original description and that the Governor be requested to make this change in the usual manner.

Respectfully submitted,

C. S. JUDD,  
Superintendent of Forestry.

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## Modification of Boundary

---

KEALIA FOREST RESERVE, KAUAI.

April 26, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu.

Gentlemen:—I respectfully recommend a modification of the boundaries of the Kealia Forest Reserve, District of Kawaihau, Island of Kauai, which will result in eliminating some flat land, not now covered by forest, which is more valuable for the intensive cultivation of cane and pineapples, and which is in demand

for this purpose. The proposed modification will throw out of the reserve 358 acres in Anahola and 403 acres in Kamalomaloo, both of which are government lands, or a total area of 761 acres.

As will be seen by the attached report of the former Superintendent of Forestry of August 23, 1913, the project has previously been before the Board. The case never came to a hearing because Governor Pinkham was opposed to the elimination.

The present Governor, Land Commissioner and residents of Kauai have requested that this open land, now covered only by mostly Hilo grass, be eliminated so that it may be put up for a general lease, and be utilized for some more useful purpose. A clause will be inserted in this lease requiring the construction of a stock-proof fence on the new boundary.

In my opinion this open land is not essential to the remainder of the reserve because the forest begins further back at the new recommended line, and it is there that the permanent line should be established.

I approve my predecessor's recommendation that the revised and accurate description of the boundaries of the Kealia Forest Reserve as contained in C. S. F. 2475 be used when this modification is made.

The revised boundaries, shown on the accompanying map, include the following lands:

Kapaa (Government) .....	2290 acres
Kealia (Makee Sugar Co.) .....	2470 acres
Kamolomaloo (Government) .....	630 acres
Anahola (Government) .....	3660 acres

---

Total area .....9050 acres

As will be seen from the above, 93% of the revised area belongs to the Government and the modified area, based on more accurate surveys than the original, is 885 acres less than the area originally proclaimed.

Since the land is not needed for strictly forest purposes, and is more valuable for agriculture, I recommend that the Board approve the proposed change of boundary and that the Governor be requested to make the required modification in the usual manner.

Respectfully submitted,

C. S. JUDD,  
Superintendent of Forestry.

*(Copy)*

Honolulu, August 23, 1913.

## KEALIA FOREST RESERVE, KAUAI.

Board of Commissioners of Agriculture and Forestry, Honolulu,  
Hawaii.

Gentlemen:—The purpose of this report is to recommend the elimination from the Kealia Forest Reserve, District of Kawaihau, Island of Kauai, of a portion of the government lands of Kamalomaloo and Anahola, lying on the upland between the Kaneha Reservoir and the present forest reserve boundary line across those lands. The new line passes just mauka of a proposed reservoir on Anahola in a lateral gulch on a plateau above the Anahola stream. By pushing the boundary mauka from its present location, the size of the reserve is reduced from 9935 to 9050 acres. The area to be taken out of the reserve is now open grass land with only a few scattering individual trees. It is crossed by three or four small gulches that are in part lined with shrubs, ferns and other low growing vegetation. But the relocation of the line brings the reserve boundary to what may properly now be considered as the permanent forest line.

When the Kealia Forest Reserve was created, in March, 1906, this area was included in the reserve because it was then expected that there would be put into operation a somewhat elaborate tree-planting proposition, suggested by Mr. George Fairchild, then manager of the Makee Sugar Company, which was to be carried out by his company. The argument was that this land was not suitable for agriculture, the soil being too heavy and cold, and further that it would be of more benefit to have it planted in trees rather than used for grazing. But the tree planting never was consummated, and now conditions on Kauai have so changed that all available grazing land is urgently needed. As the essential purpose in all government land work is to put each tract to the use for which it is best adapted, it seems wise to eliminate this particular section from the forest reserve and let it be used in other ways. If the suggested modification is approved by this Board, it is proposed by the Land Office, after the Governor has issued the proclamation changing the boundary, to lease the area taken out of the reserve, with the requirement that a fence be built and maintained on the new line. There is a clause in the present leases of the Anahola and Kamalomaloo lands that requires the construction of a fence on the present forest reserve boundary. Owing to the fact that this proposed change was pending, that fence has not been built. The fencing of the proposed line will effectively prevent stock from getting into the dense forest mauka.



In preparing the revised description of the reserve boundary, the Territorial Survey Office has also made some corrections on other courses than those across Anahola and Kamalomaloo. These are based on more accurate data, the result of recent surveys, than were in hand when the description was originally compiled. The corrected description of the entire Kealia Forest Reserve accompanies this report. It is numbered C. S. F. 2475, and recorded on Government Registered Maps Nos. 2282, 2449 and 2452.

Believing for the reasons stated above that the proposed elimination is for the general benefit of the Territory and that, since the tree planting project has fallen through it will increase rather than diminish the value of the reserve as a whole to take this area out, I do now recommend that the Board approve the proposed change of boundary and that the Governor be requested, as provided by law, to make the required modification.

Very respectfully,

(Signed)

RALPH S. HOSMER,  
Superintendent of Forestry.

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## Plant Inspection Notes

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BY E. M. EHRHORN, *Chief Plant Inspector.*

The Federal Horticultural Board passed the following new Rules and Regulations:

Quarantine Notice No. 40 supersedes Quarantine Notice No. 35 concerning the Japanese Beetle in New Jersey by extending the quarantined area and classifying shipments into (1) farm garden and orchard products of all kinds, including fresh or perishable crops; (2) grain and forage crops of all kinds; (3) nursery, ornamental and greenhouse stock and all other plants, including bulbs and cut flowers; and (4) soil, compost and manure other than fresh manure. All these materials shall not be moved or allowed to be moved interstate from said quarantined districts in any manner or method or under conditions other than those prescribed in the rules and regulations in the Quarantine Notice. Mention is made of the various townships of the quarantined territory. This beetle, as stated in a previous note, is not the Japanese Rose Beetle of our Islands and has different habits, feeding in the day time. All interstate shipments from the quarantined area are inspected, certificates are issued and all packages are marked with the name and address of the consignor and consignee.

Notice of Quarantine No. 41, with regulations, was passed on February 21 and prohibits the importation in the United States from all foreign countries and localities of the stalk and all other parts, whether used for packing or other purposes, in the raw or unmanufactured state, of Indian corn or Maize (*Zea mays*), broom corn, sweet sorghums, grain sorghums, Sudan grass, Johnson grass, sugar cane, including Japanese varieties, pearl millet, napier grass, teosinte and Job's tears on account of several dangerous plant pests including so-called European corn borer (*Pyrausta nubilalis*) and other dangerous insects as well as plant diseases existing in Europe, Asia, Africa, Dominion of Canada, Mexico, Central and South America and other foreign countries and localities.

Notice of Quarantine No. 42 was also passed February 21 and prohibits the importation of Indian corn or Maize (*Zea mays*) from any of the states in Mexico. On account of finding that corn seed from that country is more or less contaminated with cotton seed and to avoid the introduction of the Pink bollworm of cotton, this regulation has been passed. All persons contemplating the importation of corn from Mexico shall first make application to the Federal Horticultural Board for a permit as required by regulation (1) of this notice. Any information on this and other subjects will be gladly given by the Chief Plant Inspector of the Board of Agriculture and Forestry.

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## Division of Forestry

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Honolulu, June 14, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu.

Gentlemen:—I respectfully submit the following routine report of the Division of Forestry for the month of May, 1920:

### TREE PLANTING.

During the month 4353 trees were planted out on two reserves on Oahu. On Tantalus 590 koa trees were set out in the small valley among the mountain lots and in the Lualualei Forest Reserve near Kolekole Pass 1198 red gum, 1702 red mahogany, 261 logwood and 602 Australian red cedar trees were planted out.

On May 8, an inspection of the planting was made at the Waiahole Forest Reserve, and in spite of the rather dry weather the trees were found to be growing well.

From Mr. E. Phillips Turner, Secretary of the Department of Forestry at Wellington, New Zealand, a shipment was received, on May 19, of seed of the following three New Zealand timber trees: Puriri, *Vitex lucens*; Totara, *Podocarpus totara* and Kauri pine, *Agathis Australis*. These were arranged for through the kindness of Mr. A. Moritzson and have been sowed in the nursery.

## CONGRESSIONAL VEGETABLE SEED.

A shipment of 6000 packages of vegetable seed from the U. S. Department of Agriculture was received on May 13, through arrangements made by our Delegate to Congress, Hon. J. K. Kalanianaʻole. These are greatly in demand this year and are being distributed to applicants throughout the Territory.

## FOREST FIRES.

The condition of the forest in some parts of the Territory continues to constitute a fire menace on account of the absence of the usual rainfall and it was deemed necessary as a precaution on May 3, to issue a notice under the provisions of Sec. 497, R. L. H. 1915, requiring permits to start fires to clear land for a period of eight months.

The following three fires, which were promptly put under control by Fire Wardens, were reported during the month:

May 1. Woodlawn, Manoa Valley, Honolulu. A fire built to clear land for the planting of pineapples jumped the fire guard at 3 p. m., and burned over about 10 acres of grass and ferns on the side of a hill. It was extinguished in 2½ hours by local men and officers from the Government Nursery.

May 1. Waiakea, Hawaii. A fire started from a cane trash fire and burned over about 300 acres of mostly grass, brush, and young ohia trees on the Richardson land on the 1880 flow near Hilo. Very little of the old forest was touched, and it was extinguished the next day by men working under Fire Warden James Henderson and Ranger MacKenzie.

May 27. The first fire in 16 years in the Koolau Forest Reserve, Maui, started at 3:30 p. m., at Nahiku between Kapaula and Waiohū gulches, but was put under control by 7 p. m. the same day by men working under Fire Warden W. F. Pogue. Above the ditch it burned over 20 acres of forest in the reserve and below the ditch outside of the reserve it burned over 175 acres.

## FIELD TRIPS.

Considerable time was spent with President Atkinson in going over forestry matters in the office and on May 20 I accompanied him on an inspection trip through the Tantalus forest and on May 27 on an inspection of forest reserve matters in Waianae Valley, when the new Forest Ranger Mr. J. P. Pico was installed.

## FOREST RESERVE HEARING.

The Governor has set Wednesday, June 9, as the date for the hearing to consider the proposed changes in forest reserves recently passed upon by the Board. The hearing will take place at the Government Nursery at 2 p. m., and will be followed at 2:30 p. m. by a hearing to consider arguments for or against the adoption of Rule 5 of the Division of Forestry, which proposes to prohibit tramping on the higher slopes of Manoa and Palolo Valleys in the interest of forest protection.

Respectfully submitted.

C. S. JUDD,  
Superintendent of Forestry.

## REPORT OF FOREST NURSERYMAN.

Honolulu, June 10, 1920.

Superintendent of Forestry, Honolulu, Hawaii.

Sir:—I herewith submit a report of the principal work done during the month of May, 1920:

## NURSERY

## Distribution of Plants—

	Pot-grown plants	Plants in transplant Boxes	Total
Sold .....	133		133
Gratis .....	601	100	701
Total .....	734	100	834

## COLLECTIONS.

## Government Realizations—

Collections on account of plants sold.....	\$ 3.20
Rent of office, Nursery grounds, April.....	35.00
Total .....	<u>\$38.20</u>

## Animal Industry Revolving Fund—

Kamehameha Schools—Drugs for animals.....	<u>\$25.35</u>
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## PLANTATION COMPANIES AND CORPORATIONS.

Under this heading we have received several orders for trees from plantations on Maui and Hawaii. The trees are wanted for the coming planting season, which commences about the beginning of November. Altogether 70,000 trees have so far been ordered.

## MAKIKI STATION.

The work at this station has been as follows: Mixing and sterilizing soil, transplanting trees into pots and boxes, cutting up wood for seed and plant boxes. The latter work is usually done when it is too wet to work outside.

## HONOLULU WATERSHED PLANTING.

On the piece of land adjoining the Schmidt property, 590 koa trees were planted. A start has also been made to plant up the piece of land mauka of the Waterhouse property, and which in former years contained a natural pond stocked with fish. This pond has for many years been dry, and the site will make a choice location for a quantity of our Australian red cedar trees, several thousand of which we have on hand ready to plant out.

## ADVICE AND ASSISTANCE.

The writer has made the following number of calls and otherwise given advice and assistance:—

Calls made .....	6
Advice by telephone .....	8
Advice to people calling .....	10



## SUB-NURSERIES.

Hilo Nursery, Hawaii—

Brother M. Newell reports that he distributed during the past month 920 trees in transplant boxes.

## HAIKU NURSERY, MAUI.

In his monthly report, Mr. James Lindsay states that he distributed 190 trees in transplant boxes during the month of May.

## KALAHEO NURSERY, KAUAI.

Mr. Joe Rita, Jr., in charge of this nursery, reports that he distributed during the past month 428 trees in tins.

Respectfully submitted,

DAVID HAUGHS,  
Forest Nurseryman.

## Division of Entomology

Honolulu, June 9, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—During the month of May the insectary handled 25,400 pupae of the melon fly, from which there were bred 2843 females and 2551 males *Opus fletcheri*.

The distribution of parasites was as follows:

**Opus Fletcheri.**

	Females.	Males
Oahu:		
Kaimuki . . . . .	300	300
Mōiiliili . . . . .	350	350
Waianae . . . . .	350	350
Pearl Harbor . . . . .	250	250
Maui:		
Makawao . . . . .	200	200
Hawaii:		
Pāuilo . . . . .	300	300

**Diachasma Tryoni.**

Oahu:		
Pearl City . . . . .	50	50
Kaimuki . . . . .	100	100
Manoa . . . . .	300	300
Piikoi St. . . . .	100	100
Wahiawa . . . . .	150	150
Maui:		
Kula . . . . .	200	200
Makawao . . . . .	50	50

**Diachasma Fullawayi.**

Oahu:		
Pearl City . . . . .	20	20
Manoa . . . . .	150	150
Piikoi St. . . . .	50	50
Wahiawa . . . . .	10	10

Maui:		
Kula . . . . .	60	60
<b>Opius Humilis.</b>		

Oahu:		
Pearl City . . . . .	50	50
Manoa Valley . . . . .	50	50
Kaimuki . . . . .	100	100
Wahiawa . . . . .	100	100

Maui:		
Kula . . . . .	50	50
Makawao . . . . .	25	25

**Tetrastichus Giffardianus.**

Oahu:		
Pearl City . . . . .		400
Kaimuki . . . . .		300
Manoa . . . . .		1200
Wahiawa . . . . .		300

Maui:		
Kula . . . . .		500
Makawao . . . . .		500

**Galesus Silvestri.**

Oahu:		
Nuuanu Valley . . . . .		400
Kaimuki . . . . .		100

**Dirhinus Giffardi.**

Oahu:		
Kaimuki . . . . .		300
Nuuanu . . . . .		350

**Spalangia Cameroni.**

Oahu:		
Moanalua Dairy . . . . .		1600
Hawaii:		
Volcano House . . . . .		500

Since returning from Hawaii, the entomologist has been engaged in the study of the life history of the fern weevil, drug fly predators and termites.

Respectfully submitted,

D. T. FULLAWAY,  
Entomologist.

## Division of Plant Inspection

Honolulu, May 31, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—I respectfully submit my report of the work carried on by the Division of Plant Inspection for the month of May, 1920, as follows:

During the month 75 vessels arrived at the Port of Honolulu, 20 of which carried vegetable matter and 12 vessels came through the Panama Canal Zone. The following disposal was made of the various shipments:

Passed as free from pests.....	711 lots	6436 pkgs
Fumigated . . . . .	18 "	18 "
Burned . . . . .	44 "	44 "
Returned . . . . .	2 "	2 "

Total Inspected . . . . .	775 lots	6500 pkgs
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Of these shipments 6153 packages arrived as freight, 250 packages as mail and 97 packages as baggage.

#### RICE AND BEAN SHIPMENTS.

During the month 19,644 bags of rice from Japan, 1245 mats of rice from China and 1715 bags of beans from Japan arrived and were found free from pests.

#### PESTS INTERCEPTED.

Approximately 2910 pieces of baggage belonging to immigrants from foreign countries were examined, from which 25 lots of fruit and 12 lots of vegetables were seized and destroyed.

On May 3, per *Siberia Maru*, a package of cow pea seed in the mail from France was fumigated precautionarily.

On May 4, per *Manoa*, 4 pineapple suckers in the mail from the U. S. D. A. for Dr. Lyon were fumigated precautionarily, and are now in quarantine under our supervision. A package of plants also in the mail from the mainland was fumigated on account of a colony of ants (*monomorium* sp.) in the packing.

On May 9, per *Makura*, a plant in the baggage of a passenger was returned on board, being prohibited.

On May 11, per *West Neris*, a box of seeds from Java for Dr. Lyon was fumigated precautionarily. Under even date, by the *Colombia*, two packages of paddy rice were found in the mail from Manila and Japan respectively, and a package of cotton seed from Japan, all of which were seized and destroyed, being contraband. Three packages of Vegetable seeds from Manila in the mail were fumigated, two precautionarily and one on account of weevil indications. A package of pili nuts from Manila was fumigated precautionarily.

On May 16, per *Niagara*, a package of seed was found in the mail for the Board of Agriculture from Sydney and fumigated precautionarily.

On May 22, per *South Bend*, a package of cotton seed in possession of a passenger was seized and destroyed, being contraband.

On May 23, per *Korea Maru*, two baskets of yams in the cargo from China were fumigated on account of ants (*Prenolepis* sp.) A package of paddy rice and a package of bamboo shoots, both in the baggage of immigrants from Japan, were seized and destroyed, being prohibited. A package of walnuts in the possession of a passenger from China was fumigated precautionarily. Two packages of paddy rice, one from Manila and the other from Japan, were found in the mail, seized and destroyed. Two packages of tree seeds in the mail from Siam for Dr. Lyon and a package of seed from Japan were fumigated precautionarily.

Referring to my report of March 31, regarding a bag of rice paddy in the cargo from Japan, beg to report that the importer waived all claims and the bag was turned over to me and burned May 7.

#### HILO INSPECTION.

Brother M. Newell, Inspector at Hilo, reports the arrival of six steamers at the Port of Hilo. Four carried vegetable matter consisting of 123 lots and 1349 parcels, all clean.

## KAHULUI INSPECTION.

Mr. Will J. Cooper, Inspector at Kahului, reports the arrival of eight vessels at the Port of Kahului. Two carried vegetable matter consisting of eight lots and 350 parcels, all passed.

## INTER-ISLAND INSPECTION.

Fifty-nine steamers plying between Honolulu and the other Island ports were attended, and the following shipments passed as free from pests:

Taro . . . . .	508 bags
Vegetables . . . . .	378 pkgs
Fruit . . . . .	339 "
Plants . . . . .	115 "
Seeds . . . . .	16 "
Pineapple Shoots . . . . .	10 "

Total Passed . . . . . 1366 pkgs

Twenty-three packages of plants and one package of fruit were refused shipment on account of infestation, undesirable soil and not complying with the regulations.

Respectfully submitted,

E. M. EHRHORN,  
Chief Plant Inspector.

## Division of Animal Industry

Honolulu, June 18, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu, Hawaii.

Gentlemen:—I beg to submit herewith my report on the work of the Division of Animal Industry for the month of May, 1920:

### HEMORRHAGIC SEPTICEMIA AMONG THE CATTLE IN KAU, HAWAII:

On April 30, a wireless was received from the Deputy Territorial Veterinarian for the Hilo district that hemorrhagic septicemia had broken out among the cattle on the Kaalualu Ranch, Naalehu, Kau, and requesting the presence of the Territorial Veterinarian with 2500 doses of vaccine.

Pursuant to official instructions, I left the next day and arrived at Naalehu on May 2. The same day post-mortem examinations were made of two cows which had recently died and Dr. Elliot's diagnosis confirmed.

At that time between twenty and thirty head of plantation stock, and a dozen or more animals belonging to homesteaders had died. As these deaths had occurred in widely-scattered pastures, the situation appeared somewhat serious, and a message was sent to this Board requesting that 10,000 doses of vaccine be ordered without delay.

Vaccination was begun the next day, May 3, and from then until the 16th, a total of 4934 plantation animals and 1372 homesteaders'



animals were vaccinated. During the same period the total number of deaths had increased to 120 head. Of these, between thirty and forty were examined post-mortem, while a total of twenty-four sick animals were treated with curative serum.

On the tenth day after beginning vaccination, the disease had been practically checked. Only one case occurred subsequently, and that was not until the 27th or 28th, and was possibly an animal which had escaped vaccination.

#### NATURE OF THE DISEASE.

Hemorrhagic septicemia is an acute inflammatory disease characterized by the appearance of bloody exudations under the skin and in the various organs of the body. Gelatinous swellings and exudations are also found in most cases. As a rule the disease attacks either the thoracic organs or else the abdominal form may be the initial one.

In the first case, there is a croupous pneumonia, which speedily puts an end to the animal's life, the disease lasting only a few hours. In the abdominal form there is extensive hemorrhagic inflammation of the intestines, especially the small intestine, though sometimes even the fourth or true stomach may be found filled entirely with blood. In some cases both forms occur simultaneously and the animal rarely survives for more than twelve hours.

Later in an outbreak the disease becomes less acute, the animals living from three to four days and perhaps longer. In these cases, curative treatment may be resorted to, but of the twenty-four animals which were treated during this outbreak, not more than six survived and all of them came under treatment at the time when the symptoms were just beginning to manifest themselves. This fact would indicate that the outbreak was of an extremely virulent nature, and while it was impossible to say how many animals would have died if they had not been vaccinated so promptly, it is safe to surmise that the number of deaths would have greatly exceeded the 120 head recorded.

#### INFECTIOUS ABORTION ON MAUI.

On the 19th instant, a wireless was received from the Deputy Territorial Veterinarian on Maui requesting my presence without delay. As there was a possibility of catching the S. S. "Kilauea" at Kealahou Bay, I left Naalehu the following day, having previously arranged for interviews with cattlemen throughout Kona. I learned on my way that while a good many cattle had died there on account of the drought, no cases of any disease resembling hemorrhagic septicemia had been noticed. As most of the dead animals had been skinned, the owners could not have failed to notice the characteristic bloody spots under the hide, and I am therefore inclined to believe that the disease so far has confined itself to the Naalehu district.

On Maui an outbreak of infectious abortion among the milch cows in one of the largest dairies on the island had caused considerable alarm, and as this disease is one of very recent origin in these islands, the owners were anxious to have the diagnosis confirmed and to obtain advice as to treatment and prevention. I am pleased to report, however, that Dr. Fitzgerald had taken every precaution possible to prevent the further spread of the disease and that he had the situation well in hand. After visiting a number of dairies from Haiku to Lahaina with him, I returned to Honolulu.

On May 30, I was advised by the manager of the Hutchinson Plantation Company that only the one case above referred to had occurred since my departure, and that the epidemic seemed to be completely checked. This report has at the present writing been confirmed by Dr.

Elliot. At the same time Dr. Fitzgerald reports that he has vaccinated thirty head of cattle in the infected dairies, and that no more cases have occurred.

That the Animal Industry Revolving Fund created by the last Legislature, authorizing this office to keep on hand and replenish—without red tape—supplies of vaccines and serums for the immediate suppression of devastating outbreaks like the Kau epidemic, has served its end, would seem incontrovertible.

Respectfully submitted,

VICTOR A. NORGAARD,  
Territorial Veterinarian.

#### REPORT OF ASSISTANT VETERINARIAN.

Honolulu, June 15, 1920.

Dr. V. A. Norgaard, Chief Division of Animal Industry,  
Bureau of Agriculture and Forestry, Honolulu.

Sir:—I beg to submit the following report for the month of May:

#### TUBERCULOSIS CONTROL.

The following dairies were tested (tuberculin):

	Tested.	Passed.	Condemned.
Kemo Farm .....	133	133	0
T. F. Farm .....	93	92	1
P. F. Neves .....	16	16	0
F. Fugisue .....	19	19	0
J. Yamanee .....	3	3	0
Lum Ho .....	3	3	0
M. Kurihara .....	5	5	0
Frank Andrade .....	45	43	2
K. Mitsunaga .....	10	10	0
M. Freitas .....	11	11	0
J. A. R. Vierra .....	1	1	0
Waialae Ranch .....	285	255	29
Lunalilo Home .....	1	1	0

From the above list it will be seen that a total of 625 head were tested, out of which number 593 were passed and 32 condemned and branded.

Besides the above, three head of condemned cows were post-mortemed at local abattoirs.

#### CONTAGIOUS EPITHELIOMA.

One thousand c. c. of vaccine for this disease was made up in the laboratory, of which amount about 500 c. c. have been distributed among various owners.

#### IMPORTATION OF LIVE STOCK.

During the past month 45 vessels were boarded by the Inspector, and the following found to carry livestock for this Territory.

S. S. Manoa, San Francisco: 32 crates poultry  
S. S. Logan, San Francisco: 1 goat; 2 cats, J. Marsh.  
S. S. Maui, San Francisco: 1 Boston bull terrier, E. B. Hess.  
S. S. Colombia, Orient: 2 Chow dogs, W. G. Hall.  
S. S. West Nilus, San Francisco: 1 fox terrier, J. J. Smith; 12 mules, Cal. Packing Co.; 30 mules, Haiku F. & P. Co.

S. S. Lurline, San Francisco: 1 horse, F. E. Richardson; 3 horses, John O'Rourke; 4 horses, Alexander & Baldwin, Ltd.; 12 mules, Alexander & Baldwin, Ltd.; 25 crates poultry.

S. S. Sonoma, San Francisco: 1 Airedale, J. E. Boyle.

Respectfully submitted,

L. N. CASE,  
Assistant Territorial Veterinarian.

## By Authority

### PROCLAMATION OF MODIFICATION OF THE OLAA FOREST PARK RESERVE, DISTRICT OF PUNA, ISLAND AND COUNTY OF HAWAII, TERRITORY OF HAWAII.

Under and by virtue of the authority vested in me by the provisions of Chapter 37 of the Revised Laws of Hawaii of 1915, and of every other power me hereunto enabling, I, C. J. McCARTHY, Governor of Hawaii, with the approval of a majority of the Board of Commissioners of Agriculture and Forestry, having held the hearing of which notice has been duly given all as in said laws provided, do hereby modify the boundary and increase the area of Section C of the Olaa Forest Park Reserve in the District of Puna, Island and County of Hawaii, Territory of Hawaii, created and set apart by Proclamation of the Governor of Hawaii on August 20, 1914, and as provided by law, I do now and hereby SET APART as an integral part of Section C of the Olaa Forest Park Reserve, that certain portion of land in Olaa belonging to the Territory of Hawaii, containing an area of 30,000 square feet, more or less, in the District of Puna, Island and County of Hawaii, Territory of Hawaii, more particularly described by and on maps made by the Government Survey Department of the Territory of Hawaii, which said maps are now on file in the said Survey Department marked Government Survey Reg. Map No. 2577 and "F. G. Snow to Territory of Hawaii, Portion of Lot 328, Olaa Reservation Lots, being portion of Grant 4237 to W. A. McKay, Olaa, Puna, Hawaii," and a description accompanying the same numbered C. S. F. 3028, which said description now on file in the said Survey Department is as follows:

F. G. Snow to Territory of Hawaii  
Portion of Lot 328, Olaa Reservation Lots,  
Being portion of Grant 4237, to W. A. McKay,  
Olaa, Puna, Hawaii.  
C. S. F. 3028.

Beginning at the South corner of this lot, being also the South corner of Lot 328, Olaa Reservation Lots, and the North corner of Volcano Road and a 30 foot side road, the coordinates of said point of beginning referred to Government Survey Trig. Station "Olaa" being 43,200.5 feet South and 34,839.7 feet West, as shown on Government Survey Registered Map No. 2577, and running by true azimuths:

1. 124° 12' 150.0 feet along 30 foot side road;
  2. 214° 12' 200.0 feet along remaining portion of Lot 328, Olaa Reservation Lots;
  3. 304° 12' 150.0 feet along Forest Reserve (government land);
  4. 34° 12' 200.0 feet along Volcano Road to the point of beginning.
- Area, 30,000 square feet.

In witness whereof, I have hereunto set my hand and

(Seal) caused the Great Seal of the Territory of Hawaii to be affixed.

Done at the Capitol in Honolulu, this 21st day of June,  
A. D. 1920.

C. J. McCARTHY,  
Governor of Hawaii.

By the Governor:

CURTIS P. IAUKEA,  
Secretary of Hawaii.

**PROCLAMATION OF WITHDRAWAL OF CERTAIN LANDS FROM  
THE OLAA FOREST RESERVE, DISTRICT OF PUNA, ISLAND  
AND COUNTY OF HAWAII, TERRITORY OF HAWAII.**

Under and by virtue of the authority vested in me by the provisions of Chapter 37 of the Revised Laws of Hawaii of 1915, and of every other power me hereunto enabling, I, C. J. McCARTHY, Governor of Hawaii, with the approval of a majority of the Board of Commissioners of Agriculture and Forestry, having held the hearing of which notice has been duly given all as in said laws provided, do hereby WITHDRAW and ELIMINATE from the Olaa Forest Reserve, in the District of Puna, Island and County of Hawaii, Territory of Hawaii, created and set apart by Proclamation of the Governor of Hawaii on December 31, 1918, that certain portion of the government land called Olaa, containing 83.10 acres, more or less, in the District of Puna, Island and County of Hawaii, Territory of Hawaii, more particularly described by and on maps made by the Government Survey Department of the Territory of Hawaii, which said maps are now on file in the said Survey Department marked Government Survey Reg. Map No. 2179 and "Lease, S. Kana mori Application, Portion of the Government Land of Olaa, Olaa, Puna Hawaii, Within Olaa Forest Reserve," and a description accompanying the same numbered C. S. F. 3299, which said description now on file in the said Survey Department is as follows:

**LEASE.**

S. Kanamori Application.  
Portion of the Government Land of Olaa,  
Olaa, Puna, Hawaii.  
Within OLAA FOREST RESERVE.  
C. S. F. 3299.

Beginning at the East corner of this piece and the Northwest corner of OLAA FOREST PARK RESERVE, Section "A", the coordinates of said point of beginning referred to Government Survey Trig. Station "Olaa" being 48,348.0 feet South and 42,412.0 feet West, as shown on Government Survey Registered Map No. 2179, and running by true azimuths:

1. 34° 12' 1750.0 feet along OLAA PARK FOREST RESERVE, Section "A," across 30 foot road and along remaining portion of OLAA FOREST RESERVE;
2. 124° 12' 2069.0 feet along remaining portion of OLAA FOREST RESERVE;
3. 214° 12' 1750.0 feet along same and across 30 foot road, and along Grant 4324 to F. Brughelli;
4. 304° 12' 2069.0 feet along Lots 381 and 380 of the Olaa Reservation Lots, to the point of beginning.  
Area, 83.10 acres.



(Seal) In witness whereof, I have hereunto set my hand and caused the Great Seal of the Territory of Hawaii to be affixed.

Done at the Capitol in Honolulu, this 21st day of June, A. D. 1920.

C. J. McCARTHY,  
Governor of Hawaii.

By the Governor:

CURTIS P. IAUKEA,  
Secretary of Hawaii.

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**PROCLAMATION OF WITHDRAWAL OF CERTAIN LAND FROM  
THE HONOLULU WATERSHED FOREST RESERVE, DISTRICT  
OF HONOLULU, CITY AND COUNTY OF HONOLULU, ISLAND  
OF OAHU, TERRITORY OF HAWAII.**

Under and by virtue of the authority vested in me by the provisions of Chapter 37 of the Revised Laws of Hawaii of 1915, and of every other power me hereunto enabling, I, C. J. McCARTHY, Governor of Hawaii, with the approval of a majority of the Board of Commissioners of Agriculture and Forestry, having held the hearing of which notice has been duly given all as in said laws provided, do hereby WITHDRAW and ELIMINATE from the Honolulu Watershed Forest Reserve in the District of Honolulu, City and County of Honolulu, Island of Oahu, Territory of Hawaii, created and set apart by Proclamation of the Acting Governor of Hawaii, on October 13, 1913, that certain portion of government land on Tantalus Heights containing an area of 3,230 square feet, more or less, in the District of Honolulu, City and County of Honolulu, Island of Oahu, Territory of Hawaii, more particularly described by and on a map made by Geo. F. Wright, which said map is now on file in the Government Survey Department of the Territory of Hawaii marked "Application to Purchase by Parke Estate, Portion of Government Land Within the Honolulu Watershed Forest Reserve, Tantalus Heights, Honolulu," and a description accompanying the same numbered C. S. F. 3327, which said description now on file in said Survey Department is as follows:

Portion of Government Land  
within the Honolulu Watershed Forest Reserve,  
Tantalus Heights, Honolulu.

Also covered by Executive Order No. 6, Makiki Park and  
Reservation.  
C. S. F. 3327.

Beginning at the East corner of this piece, being also the most northerly corner of Lot 14, Tantalus Lots (Grant 4544 to A. V. Gear), and being also the West corner of Lot 13, Tantalus Lots (Grant 4543 to Fred Harrison), the coordinates of said point of beginning referred to Government Survey Trig. Station "Nahuina" being 379.0 feet South and 2223.4 feet East, and running by true azimuths:

1. 64° 00' 96.8 feet along said Lot 14;
2. 129° 51' 11.3 feet along government land;
3. 217° 20' 52.0 feet along same;
4. 230° 35' 57.6 feet along same;
5. 335° 20' 47.0 feet along same and 16 foot road, to the point of beginning.

Area, 3,230 square feet.

In witness whereof, I have hereunto set my hand and

(Seal) caused the Great Seal of the Territory of Hawaii to be affixed.

Done at the Capitol in Honolulu this 21st day of June  
A. D. 1920.

C. J. McCARTHY,  
Governor of Hawaii.

By the Governor:

CURTIS P. IAUKEA,  
Secretary of Hawaii.

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**PROCLAMATION OF MODIFICATION OF BOUNDARY OF THE  
LIHUE-KOLOA FOREST RESERVE, DISTRICT OF  
PUNA, ISLAND AND COUNTY OF KAUAI.**

Under and by virtue of the authority vested in me by the provisions of Chapter 37 of the Revised Laws of Hawaii of 1915, and of every other power me hereunto enabling, I, C. J. McCARTHY, Governor of Hawaii with the approval of a majority of the Board of Commissioners of Agriculture and Forestry, having held the hearing of which notice has been duly given all as in said laws provided, do hereby MODIFY the boundary and change the area of the Lihue-Koloa Forest Reserve, in the District of Puna, Island and County of Kauai, Territory of Hawaii, created and set apart by Proclamation of the Governor of Hawaii, on June 5, 1909, by eliminating therefrom in the land of Hanamaulu areas amounting to 230.40 acres and by adding thereto in the land of Hanamaulu areas amounting to 11.60 acres, and by eliminating therefrom in the land of Wailua areas amounting to 438.85 acres, more or less which modification of boundary is more particularly shown by and on a map made by the Government Survey Department of the Territory of Hawaii, which said map is now on file in the said Survey Department, marked, "Lower Line of Lihue-Koloa Forest Reserve, from 'Puupae' to 'Kilohana,' through Lands of Wailua and Hanamaulu," and a description accompanying the same numbered C. S. F. 1966, which said description now on file in the said Survey Department and hereby approved as now constituting the official description of the Lihue-Koloa Forest Reserve, differs from the original description that forms a part of the proclamation of the Lihue-Koloa Forest Reserve by substituting the following courses in place of Courses 28 to 34, both inclusive, in the original description (C. S. F. 1966):

Proposed Amendment of the Lower Boundary of the

**LIHUE-KOLOA FOREST RESERVE**

through the lands of Hanamaulu and Wailua,  
Island of Kauai.

By substituting the following courses in place of Courses 28 to 34 both inclusive:

28. Thence across Halemaumau along forest fence to a Forest Reserve Monument, the direct azimuth and distance being: 153° 01' 9659.3 feet;
29. Thence still across Hanamaulu along forest fence to near edge of South bank of the South branch of the Wailua River, the direct azimuth and distance being: 197° 07' 2956.4 feet;
30. Thence still across Hanamaulu along forest fence to near top edge of the North bank of the South branch of the Wailua River, the direct azimuth and distance being: 238° 41' 4195.9 feet;
31. Thence across Wailua along forest fence, the direct azimuth and distance being: 203° 49' 3428.6 feet;

- 32. Thence still across Wailua along forest fence to a Forest Reserve Monument, the direct azimuth and distance being: 169° 13' 4251.2 feet;
- 33. Thence still across Wailua along forest fence, the direct azimuth and distance being: 182° 45' 2650.7 feet;
- 34-A. Thence still across Wailua along forest fence to the South bank of the North branch of the Wailua River, the direct azimuth and distance being: 249° 50' 2680.0 feet;
- 34-B. Thence still across Wailua crossing the North branch of the Wailua River to the end of forest fence on the North bank of said river, the direct azimuth and distance being: 147° 57' 1672.9 feet;
- 34-C. Thence still across Wailua, along forest fence, the direct azimuth and distance being: 200° 03' 4733.8 feet;
- 34-D. Thence still across Wailua along forest fence to end of fence on the South bank of the South Branch of the Opaikaa Stream, the direct azimuth and distance being: 276° 44' 2219.0 feet;
- 34-E. Thence still across Wailua, across said stream to a Forest Reserve Monument on the Kamooheopulu Ridge, and on the boundary of Wailua and North Olohena, the direct azimuth and distance being: 254° 24' 1581.1 feet;

and by adding the following to the original description:

"Excepting and reserving therefrom the bottom lands along the North Fork of the Wailua River which are suitable for agricultural purposes; such agricultural lands to be determined jointly by the Superintendent of Forestry and the Commissioner of Public Lands.

And, as provided by law, I do hereby recommend the elimination from the Lihue-Koloa Forest Reserve of areas amounting to 230.40 acres in the land of Hanamaulu, do hereby recommend and approve as an integral part of the Lihue-Koloa Forest Reserve areas amounting to 11.60 acres in the land of Hanamaulu, and do hereby eliminate from the Lihue-Koloa Forest Reserve areas amounting to 438.85 acres, more or less, in the land of Wailua as shown in the above description.

(Seal) In witness whereof, I have hereunto set my hand and caused the Great Seal of the Territory of Hawaii to be affixed.

Done at the Capitol in Honolulu this 21st day of June,  
A. D. 1920.

C. J. McCARTHY,  
Governor of Hawaii.

By the Governor:

CURTIS P. IAUKEA,  
Secretary of Hawaii.

### PROCLAMATION OF MODIFICATION OF BOUNDARY OF THE KEALIA FOREST RESERVE, DISTRICT OF KAWAIHAU.

UNDER and by virtue of the authority vested in me by the provisions of Chapter 37 of the Revised Laws of Hawaii of 1915, and of every other power me hereunto enabling, I, C. J. McCARTHY, Governor of Hawaii, with the approval of a majority of the Board of Commissioners of Agriculture and Forestry, having held the hearing of which notice has been duly given all as in said laws provided, do hereby modify the boundary and change the area of the Kealia Forest Reserve in the District of Kawaihau, Island and County of Kauai, Territory of Hawaii, created and set apart by Proclamation of the Acting Governor of Hawaii on March 9, 1906, by changing certain courses in the

original description that forms a part of the proclamation of the Kealia Forest Reserve, which changes are more particularly shown by and on maps made by the Government Survey Department of the Territory of Hawaii, which said maps are now on file in the said Survey Department marked Government Survey Reg. Maps Nos. 2282, 2449 and 2452 and "Kealia Forest Reserve" and a description accompanying the same, numbered C. S. F. 2475, which said description now on file in said Survey Department is as follows:

### KEALIA FOREST RESERVE.

Including Portions of the Lands of Anahola, Kamalomaloo, Kealia, and Kapaa, District of Kawaihau, Island of Kauai.  
C. S. F. 2475.

Beginning at a Forest Reserve Monument at a point called "Puu Ulaula" on the boundary of the lands of Aliomanu and Anahola, the true azimuth and distance from said point of beginning to Government Survey Trig. Station "North Base" in Aliomanu being  $249^{\circ} 09' 54.92.1$  feet and to Government Survey Trig. Station "Waiawaawa" is  $191^{\circ} 33' 8703.4$  feet, as shown on Government Survey Registered Maps Nos. 2282, 2449 and 2452, and running by true azimuths:—

1.  $330^{\circ} 21' 30''$  875.4 feet to a  $\perp$  on stone at a place called "Paepae";
2.  $3^{\circ} 14'$  3631.0 feet to a place called "Panikioi";
3. Thence to the North bank of the Anahola River and following said North bank to a 4-inch pipe on pali, the direct azimuth and distance being:— $109^{\circ} 48'$  9569.4 feet;
4.  $46^{\circ} 15'$  1360.0 feet, more or less, across gulch and Anahola River to "Puaa" Trig. Station, marked with a  $1\frac{1}{2}$ -inch galvanized pipe;
5.  $96^{\circ} 33'$  1880.0 feet to a 4-inch pipe;
6.  $73^{\circ} 33'$  1375.0 feet to a "Peekoapu" Trig. Station, marked by a  $1\frac{1}{2}$ -inch galvanized pipe;
7.  $62^{\circ} 47'$  824.0 feet to a 4-inch pipe;
8.  $38^{\circ} 53'$  1480.0 feet to a 4-inch pipe;
9.  $82^{\circ} 37'$  687.5 feet to a 4-inch pipe;
10.  $1^{\circ} 51'$  367.2 feet to the boundary of Kamalomaloo and Anahola at a point marked with an arrow on stone;
11.  $335^{\circ} 40'$  1220.0 feet, more or less, to a 4-inch pipe;
12.  $65^{\circ} 35'$  2995.0 feet, more or less, to a 4-inch pipe at the Northeast corner of Grant 4262 to the Makee Sugar Co., and from this point Government Survey Trig. Stations "Puu Awa" bear  $142^{\circ} 14'$  and "Puu Kinui"  $325^{\circ} 22'$ ;
13.  $17^{\circ} 00'$  560.0 feet, more or less, along Grant 4262 to the Makee Sugar Co.;
14.  $352^{\circ} 10'$  898.0 feet, more or less, along Grant 4262 to the Makee Sugar Co., to the point on the boundary between Kamalomaloo and Kealia;
15.  $268^{\circ} 15'$  180.0 feet, more or less, along Grant 4262 to Makee Sugar Co.;
16.  $275^{\circ} 05'$  862.6 feet along Grant 4262 to Makee Sugar Co.;
17.  $275^{\circ} 01'$  171.6 feet along Grant 4262 to Makee Sugar Co.;
18.  $265^{\circ} 00'$  610.5 feet along Grant 4262 to Makee Sugar Co.;
19.  $304^{\circ} 16'$  95.7 feet along land of Kamalomaloo;
20.  $276^{\circ} 09'$  709.5 feet along land of Kamalomaloo;
21.  $290^{\circ} 34'$  240.2 feet along land of Kamalomaloo;
22.  $280^{\circ} 02'$  1359.6 feet along land of Kamalomaloo;
23.  $314^{\circ} 13'$  735.9 feet along land of Kamalomaloo;
24.  $295^{\circ} 20'$  573.5 feet along land of Kamalomaloo to a Forest Reserve Monument on the boundary of Kamalomaloo and Kealia at a place called "Kancha";



25. 25° 41' 3192.6 feet across land of Kealia to Government Survey Trig. Station "Puu Kinui," marked by a Forest Reserve Monument.
26. 350° 34' 2821.7 feet across the land of Kealia across Mimino Gulch to Government Survey Trig. Station "Puu Lawii" on the boundary of Kealia and Kapaa;
27. 23° 16' 917.4 feet across the land of Kapaa to a + on stone at Lot 56, Kapaa Homesteads;
28. 95° 05' 563.8 feet along Lot 56, Kapaa Homesteads, to a + on stone;
29. 115° 28' 529.7 feet along Lot 55, Kapaa Homesteads, to a + on stone.
30. 90° 04' 376.6 feet along Lot 55, Kapaa Homesteads, to a + on stone;
31. 29° 54' 333.8 feet along Lot 55, Kapaa Homesteads, to a 1½-inch pipe;
32. 39° 22' 282.8 feet along Lot 55, Kapaa Homesteads, to a + on stone;
33. 65° 05' 104.6 feet along Lot 55, Kapaa Homesteads, to a + on stone;
34. 81° 45' 138.1 feet along Lot 55, Kapaa Homesteads, to a + on stone;
35. 20° 21' 109.0 feet along Lot 55, Kapaa Homesteads, to a + on stone;
36. 343° 55' 177.9 feet along Lot 55, Kapaa Homesteads, to a + on stone;
37. 325° 40' 154.1 feet along Lot 55, Kapaa Homesteads, to a + on stone;
38. 287° 48' 114.4 feet along Lot 55, Kapaa Homesteads, to a + on stone;
39. 274° 20' 219.1 feet along Lot 55, Kapaa Homesteads, to a + on stone;
40. 355° 01' 172.7 feet along Lot 55, Kapaa Homesteads, to a + on stone;
41. 335° 53' 169.4 feet along Lot 55, Kapaa Homesteads, to a + on stone;
42. 250° 03' 105.0 feet along Lot 55, Kapaa Homesteads, to a + on stone;
43. 295° 57' 206.7 feet along Lot 55, Kapaa Homesteads, to a + on stone;
44. 1° 20' 30.0 feet across Akulikuli road to a 1½-inch pipe, from this point the Government Survey Trig. Station "Nonou" bears 345° 45';
45. 58° 47' 382.2 feet along Lot 53, Kapaa Homesteads, to a + on stone;
46. 115° 28' 137.8 feet along Lot 53, Kapaa Homesteads, to a + on stone.
47. 68° 21' 350.5 feet along Lot 53, Kapaa Homesteads, to a + on stone;
48. 102° 45' 382.7 feet along Lot 48, Kapaa Homesteads, to a + on stone;
49. 120° 28' 384.6 feet along Lot 47, Kapaa Homesteads, to Government Survey Trig. Station, "Piliamoo" (marked by a 1½-inch pipe);
50. 128° 45' 296.2 feet along Lot 47, Kapaa Homesteads, to a + on stone;
51. 77° 44' 665.1 feet along Lot 46, Kapaa Homesteads, to a + on stone;
52. 77° 03' 271.8 feet along Lot 45, Kapaa Homesteads, to a + on stone;

53. 84° 58' 388.6 feet along Lot 45, Kapaa Homesteads, to a + on a large flat rock;
54. 93° 54' 30.2 feet across Piliamoo Road to a + on stone;
55. 93° 54' 424.3 feet along Lot 44, Kapaa Homesteads, to a + on stone;
56. 95° 09' 250.0 feet along Lot 44, Kapaa Homesteads, to a + on stone;
57. 95° 09' 347.0 feet along Lot 43, Kapaa Homesteads, to a + on stone;
58. 90° 13' 556.6 feet along Lot 43, Kapaa Homesteads, to a + on stone;
59. 98° 10' 579.6 feet along Lot 42, Kapaa Homesteads, to a + on stone;
60. 90° 12' 434.5 feet along Lot 41, Kapaa Homesteads, to a + on stone;
61. 34° 34' 641.8 feet along Lot 41, Kapaa Homesteads, to a 1½ inch pipe;
62. 74° 51' 133.5 feet along Lot 26, Kapaa Homesteads, to a + on stone;
63. 81° 53' 297.6 feet along Lot 26, Kapaa Homesteads, to a + on stone;
64. 81° 53' 312.6 feet along Lot 25, Kapaa Homesteads, to a + on stone;
65. 91° 26' 186.4 feet along Lot 20, Kapaa Homesteads, to a + on stone;
66. 53° 07' 295.1 feet along Lot 20, Kapaa Homesteads, to a + on stone;
67. 35° 17' 42.1 feet along Lot 20, Kapaa Homesteads, to a + on stone;
68. 35° 17' 30.0 feet across Kahuna road to a + on stone;
69. 35° 17' 59.7 feet along Lot 20A, Kapaa Homesteads, to a + on stone;
70. 46° 53' 108.2 feet crossing Makaleha Stream to a + on stone;
71. 22° 12' 150.1 feet along Lot 19, Kapaa Homesteads, to a + on stone;
72. 20° 26' 385.6 feet along Lot 19, Kapaa Homesteads, to a + on stone;
73. 22° 47' 195.1 feet along Lot 18, Kapaa Homesteads, to a + on stone;
74. 22° 47' 144.4 feet along Lot 17, Kapaa Homesteads, to a + on stone;
75. 25° 34' 230.7 feet along Lot 11, Kapaa Homesteads, to a + on stone;
76. 25° 34' 130.8 feet along Lot 9, Kapaa Homesteads, to a + on stone;
77. 50° 28' 207.7 feet along Lot 9, Kapaa Homesteads, to a + on stone;
78. 358° 02' 284.8 feet along Lot 8, Kapaa Homesteads, to a + on stone;
79. 48° 19' 206.2 feet crossing the Moalepe Stream to a + on stone at the Northwest corner of Lot 5A;
80. 92° 02' 165.1 feet along Lot 4A, Kapaa Homesteads, to a + on stone;
81. 40° 20' 69.8 feet along Lot 4A, Kapaa Homesteads, to a + on stone;
82. 100° 04' 29.0 feet crossing Moalepe Stream to a + on stone;
83. 88° 41' 34.7 feet along Lot 3A, Kapaa Homesteads, to a + on stone;
84. 88° 41' 272.9 feet along Lot 3, Kapaa Homesteads, to a + on stone;
85. 64° 44' 300.5 feet along Lot 3, Kapaa Homesteads, to a + on stone;
86. 32° 27' 304.9 feet along Lot 3, Kapaa Homesteads, to a + on stone;
87. 12° 32' 301.9 feet along Lot 2, Kapaa Homesteads, to a + on stone;
88. 36° 00' 940.0 feet along foot-hills along remainder of Kapaa (leased land);

89. 62° 00' 1200.0 feet along foot-hills along remainder of Kapaa (leased land);
90. 360° 00' 750.0 feet along remainder of Kapaa (leased land) and across the Moalepe Stream to Government Survey Trig. Station "Pukaili," (marked by a Forest Reserve Monument);
91. 75° 50' 20.0 feet along the LIHUE-KOLOA FOREST RESERVE along the land of Waipouli;
92. 108° 10' 1202.2 feet along the LIHUE-KOLOA FOREST RESERVE along the land of Waipouli;
93. 114° 08' 1083.7 feet along the LIHUE-KOLOA FOREST RESERVE along the land of Waipouli;
94. 69° 24' 462.0 feet along the LIHUE-KOLOA FOREST RESERVE along the land of Waipouli;
95. 92° 07' 330.0 feet along the LIHUE-KOLOA FOREST RESERVE along land of Waipouli;
96. 58° 31' 304.9 feet along the LIHUE-KOLOA FOREST RESERVE along the land of Waipouli;
97. 93° 08' 326.7 feet along the LIHUE-KOLOA FOREST RESERVE along land of Waipouli;
98. 113° 40' 509.0 feet along the LIHUE-KOLOA FOREST RESERVE along land of Waipouli to "Kainamanu" Trig. Station;
99. 136° 15' 138.3 feet along the LIHUE-KOLOA FOREST RESERVE along land of Waipouli;
100. 89° 42' 420.9 feet along the LIHUE-KOLOA FOREST RESERVE along land of Waipouli to a 2½ inch pipe;
101. 167° 50' 253.5 feet along the LIHUE-KOLOA FOREST RESERVE along land of Waipouli;
102. 126° 52' 231.0 feet along the LIHUE-KOLOA FOREST RESERVE along land of Waipouli;
103. 152° 39' 153.5 feet along the LIHUE-KOLOA FOREST RESERVE along land of Waipouli;
104. 146° 44' 352.9 feet along the LIHUE-KOLOA FOREST RESERVE along land of Waipouli;
105. 135° 10' 84.7 feet along the LIHUE-KOLOA FOREST RESERVE along land of Waipouli;
106. 158° 37' 96.9 feet along the LIHUE-KOLOA FOREST RESERVE along land of Waipouli;
107. 114° 00' 130.0 feet along the LIHUE-KOLOA FOREST RESERVE along land of Waipouli;
108. 90° 12' 150.0 feet along the LIHUE-KOLOA FOREST RESERVE to a concrete post at the head of the land of Waipouli and the junction of the lands of Kapaa and North Olohena at a place called "Kahilimalanai";
109. Thence along the LIHUE-KOLOA FOREST RESERVE up watershed of ridge along the land of North Olohena to a pipe at a place called "Pehuaola," the direct azimuth and distance being: 180° 59' 5544.9 feet;
110. Thence following the watershed of the ridge and along the lands of Wailua and Kalihiwai to "Makaleha," the Northwest corner of Kapaa and the Southwest corner of Kealia, the direct azimuth and distance being: 183° 48' 4427.7 feet;
111. 223° 57' 1969.0 feet along the watershed of the ridge along the Halelea Forest Reserve along the land of Kalihiwai, to a point called "Tiptop";
112. 177° 21' 1419.0 feet along the watershed of the ridge along the HALELEA FOREST RESERVE along the land of Kalihiwai, to a point called "Pueo" (marked by an iron pipe), which is the Northwest corner of Kapaa and the Southwest corner of Anahola;

113. 141° 20' 1537.0 feet along the watershed of the ridge along the  
HALELEA FOREST RESERVE along the land of Kali-  
hiwai, to a point called "Last Peak";
114. 146° 42' 6526.1 feet along the watershed of the ridge along the  
HALELEA FOREST RESERVE along the land of Kali-  
hiwai, to a point called "Namahana" (marked by an iron  
pipe) at the Northwest corner of Anahola;
115. 267° 20' 4092.0 feet along the MOLOAA FOREST RESERVE to a  
peak;
116. 249° 00' 726.0 feet along the MOLOAA FOREST RESERVE to top  
of peak;
117. 273° 00' 5214.0 feet along the MOLOAA FOREST RESERVE to  
top of Malamelamaiki Peak;
118. 245° 15' 6732.0 feet along the MOLOAA FOREST RESERVE along  
ridge;
119. 256° 00' 1254.0 feet along the MOLOAA FOREST RESERVE to  
Keeaoopuu where old road crosses range;
120. 236° 15' 4356.0 feet along ridge along MOLOAA FOREST RE-  
SERVE to bend in ridge;
121. 351° 00' 1386.0 feet along ridge along the MOLOAA FOREST RE-  
SERVE;
122. 332° 30' 891.0 feet along ridge along the MOLOAA FOREST RE-  
SERVE to Puukeakea;
123. 280° 20' 2442.0 feet along ridge along the MOLOAA FOREST RE-  
SERVE;
124. 281° 00' 1452.0 feet along ridge along the MOLOAA FOREST RE-  
SERVE to Puu Eu, the highest peak;
125. 290° 00' 4158.0 feet along ridge along the MOLOAA FOREST RE-  
SERVE to Keaweaumakua;
126. 292° 00' 2772.0 feet along the MOLOAA FOREST RESERVE to a  
pipe and large ahu on summit of Kikoo;
127. 253° 18' 3049.0 feet down face of ridge along the MOLOAA FOR-  
EST RESERVE along the land of Aliomanu to the point of  
beginning.

## AREAS.

Kapaa (Government) .....	2290 acres, more or less;
Kealia . . . . .	2470 acres, more or less;
Kamalomaloo (Government) .....	630 acres, more or less;
Anahola (Government) .....	3660 acres, more or less;
Total . . . . .	9050 acres, more or less;

And, as provided by law, I do hereby SET APART as a part of the KEALIA FOREST RESERVE those portions of the government lands of Kapaa (2290 acres), Kamalomaloo (630 acres), and Anahola (3660 acres), more or less, which lie within the metes and bounds of the above described KEALIA FOREST RESERVE.

In witness whereof, I hereunto set my hand and cause  
(seal) the Great Seal of the Territory of Hawaii to be affixed.

Done at the Capitol in Honolulu this 21st day of June,  
A. D. 1920.

C. J. McCARTHY,  
Governor of Hawaii.

By the Governor:  
CURTIS P. IAUKEA,  
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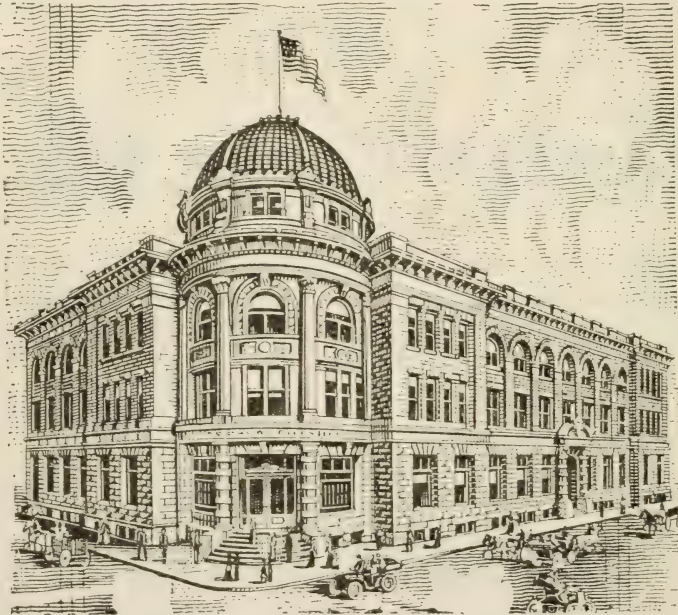
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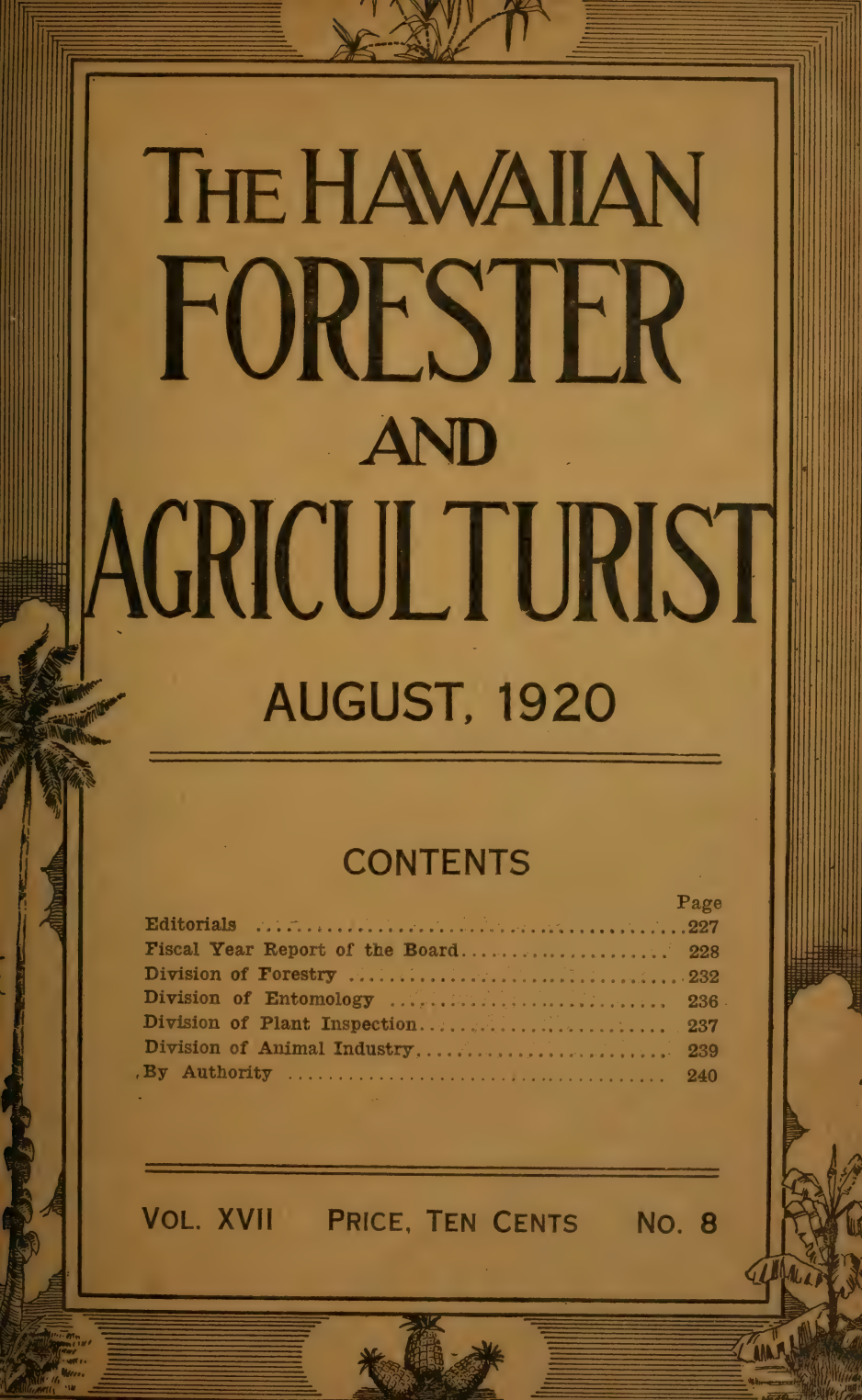
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# THE HAWAIIAN FORESTER AND AGRICULTURIST

AUGUST, 1920

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C. S. JUDD,  
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To give information about insects free of charge is one of the duties of this Division, and Hawaiian readers are hereby invited to make inquiry in person and by mail. In order to be able to advise intelligently or send the right kind of useful insects for relief, we like and sometimes it is indispensable for us to see the insects suspected or caught in the act, also specimens of the injury. In a tin with a hole or two, or a wooden box, specimens may be mailed by parcels post. When specimens are not accompanied by letter, always write your name and address in the upper left-hand corner of the package. Address all communications, DIVISION OF ENTOMOLOGY, P. O. BOX 207, HONOLULU, HAWAII.

D. T. FULLAWAY,  
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# THE HAWAIIAN FORESTER AND AGRICULTURIST

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VOL. XVII.

HONOLULU, AUGUST, 1920.

No. 8

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It is with the deepest regret that we announce the resignation of Mr. Daniel Logan as Editor of the "Forester," which was submitted on July 9, and which perforce had to be accepted because of his moving away from the Territory. Mr. Logan's faithful services in connection with the Board's publication have been greatly appreciated and he will be missed by all of his Honolulu friends.

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The report of the Board, printed in this issue, recounts the activities of the four divisions during the fiscal year ended June 30, 1920.

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The new bovine tuberculosis regulations approved by the Governor on July 6, 1920, appear in this issue.

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Plans are being made to relocate and enlarge the tree nursery at Hilo, so as to make a larger number of trees available for distribution on the big island.

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The crop of koa seeds in the forests back of Honolulu appears to be better than usual this year and an effort is being made to secure a large supply for reforestation work by the Division of Forestry.

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The breeding of parasites on the melon fly and fruit fly continues at the insectary of the Entomologist, and these are sent out free of charge upon request.

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Mr. Harry L. Denison on June 1, began his duties as Forest Ranger for the Kohala Mt. and Hamakua Pali Forest Reserves in co-operation with the forestry work of the H. S. P. A.

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Some of the vegetable seed from Washington, D. C., is still available at the Government Nursery and packages will be sent out free of charge upon application to Mr. David Haughs, Box 207, Honolulu.

SEP 1 1920

## REPORT OF THE BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY FOR THE FISCAL YEAR ENDED JUNE 30, 1920.

The work of this Board has, as during the previous fiscal year, been confined to the four main lines of work of forestry, entomology, plant inspection, and animal industry.

### FORESTRY.

Forest protection and forest extension have continued to constitute the main activities of the Division of Forestry during the past fiscal year. A few minor changes in forest reserve boundaries were made during the year in order to take in additional forest land, adjust the official boundaries to establish fence lines, or throw out agricultural land of higher value than for forest purposes. By an adjustment of boundaries the area of the Lihue-Koloa Reserve on Kauai was reduced by 658 acres and the Kealia Reserve on the same island was reduced by 885 acres. One acre along the Volcano Road was added to the Olaa Forest Park Reserve and from the Olaa Forest Reserve 83 acres of agricultural land were withdrawn so that they could be leased. The total area included in the 47 forest reserves throughout the Territory now amounts to 817,114 acres or about 20 per cent of the total land area of the eight main islands in the group. Of the area in forest reserves 557,344 acres or 68 per cent is land belonging to the Territory.

Progress has been made in fencing forest boundaries, where they are exposed to the ravages of stock, but in a smaller degree, on account of the high cost of materials and scarcity of labor. During the fiscal year the construction of new wire fences was completed on 5.25 miles of forest boundaries and 1.80 miles of old fences were repaired. An additional 2.50 miles of new fence is in the process of construction, making a total of 9.57 miles receiving attention during the year. Eleven forest and grass fires have been reported during the year, a surprisingly low number in view of the very dry condition which has prevailed. Most of these were not extensive, did very little damage, and were extinguished the same day by men working under the fire wardens of the Board.

Wild stock doing damage in forest reserves, to the total number of 584 were killed or removed during the year. These comprised 309 wild goats, 46 wild cattle and 229 wild pigs.

The field force has been increased from eight to eleven forest rangers, whose chief duty it is to carry out forest protection measures by building and repairing boundary fences, but who also are at times engaged in tree planting and general administrative duties. By the arrival of an assistant to the Superintendent at the end of the year, it will now be possible to extend the scope of forest work.

The eight forest nurseries of this Division on the four main islands propagated or distributed a total of 292,081 trees during the past calendar year for general planting throughout the Territory. Large numbers of shade trees and ornamental plants and vines were supplied to the military posts on Oahu for the beautification of quarters.

Tree planting operations on forest reserves in need of reforestation for the conservation of water were extended and consisted mainly in the planting of koa trees on well drained soil. A large variety of other trees, not used before in extensive planting, were also set out in various situations to test their adaptability. In this manner 32,648 trees were planted out on the forest reserves in spite of a comparatively dry year.

Advice and assistance on tree planting and the care of trees has been rendered the public, instruction on tree planting was given at the vocational school for soldiers at Schofield Barracks and lectures on forestry were delivered at the Territorial Summer School and the College of Hawaii.

#### ENTOMOLOGY.

The aim of the Division of Entomology has been to meet the demand for relief from insect depredations; the work, therefore, has been almost altogether practical.

The propagation and distribution of beneficial insects, particularly the fruit fly, horn fly and corn leaf hopper parasites has been continued throughout the year. Also an attempt has been made to acclimatize and establish in the islands *Pteromalus puparum*, a pupal parasite of one of the destructive cabbage insects, *Pieris rapae* (cabbage worm, imported cabbage butterfly). A small shipment was received through the co-operation of the California State Horticultural Commission in June, 1919, and thousands of individuals have been reared and liberated.

No field work has been undertaken, on account of the unsettled conditions abroad and poor transportation facilities.

An investigation was begun early in the year of the natural control of the dungflies in Hawaii, with the purpose in mind of securing additional agents, if conditions warranted it, and so improving the control. Considerable time also has been given to the study of the termites, or white ants, which are becoming severely and alarmingly destructive with the increase and spread of two lately immigrant species. These investigations remain incomplete at the present time.

In September, 1919, an infestation of the forest ferns by the Australian fern weevil, *Syagrius fulvitaris*, was discovered at 29 miles from Hilo on the Hilo-Kau road. On account of the wealth of fern growth in this region and the importance of the ferns as part of the ground cover in the Hamakua Forest Reserve, it was decided to attempt to control the outbreak and prevent the spread of the weevil beyond the confines of the small area in which it was determined to be present. This necessitated



the destruction of all ferns in the area as far as possible, which were cut and burned; thereafter the ground cover was either fired or poisoned as far as possible to destroy crawling weevils, which might have escaped the initial treatment, and every vestige of fern plant on which the beetle could subsist; and an artificial barrier of crude oil was laid to contain the insect. At the same time an investigation was made of the weevil's history, habits, cyclical development, etc., which had not previously been done, although the weevil has been known in the islands fifteen years. This work has occupied the division almost exclusively during the remainder of the year. The routine work of advising in regard to agricultural and stock pests, maintenance of collections, etc., however, has been adequately attended to.

#### PLANT INSPECTION.

The work performed by the Chief Plant Inspector and his assistants during the fiscal year ending June 30, 1920, consisted of the following:

1. The inspection of all fruit, plants and vegetables shipped from Honolulu to all ports of the other islands for the purpose of preventing the spread of any pest existing on Oahu to the adjacent islands. Honolulu being the only port of entry for foreign plants and plant products, it follows that injurious insects and diseases will first become established on Oahu.

2. The inspection of all fruit, plants and vegetables coming into the Territory by mail, freight or baggage from foreign countries and the mainland of the United States, to prevent the introduction of pests and plant diseases liable to become injurious to the various agricultural industries of these islands.

During the past fiscal year there arrived at Honolulu, Hilo and Kahului, the only ports in the Territory where fruit or vegetables enter directly and at which places local inspectors are stationed, 884 vessels. Of these, 356 carried vegetable matter consisting of 254,502 packages of fruit and vegetables and 7,560 packages of plants and seeds. Of this amount, 463 packages were fumigated on account of infestation of various kinds or as a precaution; 880 packages were burned on account of infestation or being contraband; and 517 packages were returned to the original shipper as contraband and unmailable.

In addition to the regular steamers, all tramp steamers touching at Honolulu for fuel and supplies were boarded and inspected for vegetable matter. Particular attention was given to those coming via the Panama Canal and other tropical countries in order to prevent the escape of possible pests carried on plants or vegetable supplies in transit. Notices and copies of federal and territorial quarantine laws are furnished to the proper officials of these ships in order that they may be able to take the proper precautions against bringing undesirable insects and plant diseases into the Territory.



During the year a material increase was noted in the importations of fruits and vegetables. Following are some of the larger staples imported of which the Territory does not as yet supply sufficient for home consumption:

Oranges .....	35,403	boxes
Cabbage .....	1,114	crates
Onions .....	26,639	bags
Lemons .....	5,908	boxes
Celery .....	1,048	crates
Potatoes .....	83,726	bags

Several important changes have been made in the rules and regulations, also a new regulation pertaining to potato and apple shipments from the Pacific Coast ports has been promulgated. This new regulation will do much to improve the grade and quality of these commodities.

The plans for additions to the fumigation building, the roof over the yard and the fencing are ready and have been approved, so that very soon work will be started on these improvements.

We have continued the inspection of plant produce from Honolulu to ports on the other islands on the same lines as last year. During the fiscal year, 693 steamers were attended to and 48,343 packages of plants, fruits and vegetables were inspected. Of this number, 254 packages were seized and refused shipment on account of infestation or having undesirable soil attached to the roots.

Particular attention is paid to all sugar cane seed shipments from Oahu to plantations on the other islands. All these shipments go through the Experiment Station of the H. S. P. A., and no sugar cane is permitted to go by individuals unless first submitted for examination by them. In this way all risks of introducing some new pest or disease of this large industry is avoided.

#### ANIMAL INDUSTRY.

The control and suppression of infectious and contagious diseases among live stock and the prevention, by means of inspection and quarantine, of the introduction of such diseases with imported animals have constituted, as in previous years, the main work of this Division.

The eradication of bovine tuberculosis has been continued as in the preceding years and a marked improvement has been noted during the period under review. Starting with 31.25 per cent of disease among the dairy herds, the end of the present fiscal period shows less than 1½ per cent. By means of very liberal indemnification laws, all objection to the test on the part of cattle owners has been eliminated and our work toward total eradication greatly facilitated.

No cases of glanders or epizootic lymphangitis or hog cholera have been reported from any part of the Territory. A few small

outbreaks of hemorrhagic septicemia in swine (swine plague) have been reported from the different islands, but all have been properly checked by the use of vaccine.

No cases of anthrax have been recorded during the past year and, as semi-annual vaccination is being practised, no cases are apt to occur. It is confidently expected that in a short time the Territory can be declared free from this disease.

Contagious abortion has recently made its appearance among several herds on Oahu and in at least one herd on Maui. This is the first time it has been definitely recorded from this Territory, but has for some time been expected to make its appearance, due to the increasing number of importations of dairy cattle. The serum and vaccine treatment of exposed and affected cattle is being undertaken and good results should soon be apparent.

During the latter part of the year an extensive outbreak of bovine hemorrhagic septicemia occurred on Hawaii. The immediate administration of serum and vaccine confined the loss, which otherwise would have been extensive, to less than two hundred head.

Contagious epithelioma still continues to be the bane of poultry raisers. As has been noted before, chicks should be hatched during the first four months of the year in order to escape the ravages of this disease.

Importations of live stock have slightly increased during the year. Practically all classes were represented, including some of the highest class breeding stock ever brought to this Territory.

The Territory is self-supporting as far as the production of pork is concerned. For a number of years all hogs imported from the mainland have been strictly breeding stock. Large importations of frozen beef, mutton and poultry still continue, showing that the demand is greatly in excess of the supply. The next few years should see such importations considerably reduced through the influence of such high class breeding stock as above referred to.

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## Division of Forestry

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Honolulu, July 19, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu.

Gentlemen:—I respectfully submit the following routine report of the Division of Forestry for the month of June, 1920:

### TREE PLANTING.

In addition to the tree planting operations reported on by the Forest Nurseryman, there were set out during June at Mikilua in the Lualalei Forest Reserve, Oahu, the following trees: 1,670 Australian red cedar; 1,120 red mahogany; 360 red gum, and 127 *Acacia catechu*, or a total of 3,277 trees. The trees of the last mentioned species, a valuable tree

from India for planting in our dry regions, were from a lot of 267 transplants of large size, which were kindly turned over to us by the H. S. P. A.

#### FOREST FIRES.

Only one forest fire was reported during the month. This occurred in Olaa, Hawaii, on June 9, in the region from 22 to 24 Miles along the Volcano Road, in the form of a surface fire which passed rapidly over the land before a stiff breeze and covered approximately 100 acres. It was placed under control the same day by men working with Forest Ranger Mackenzie.

#### PERSONNEL.

The new Assistant Superintendent of Forestry, Mr. Charles J. Kraebel, arrived on June 22 from Portland, Oregon, where he had been engaged in work for the U. S. Forest Service. Considerable time was spent during the remainder of the month in acquainting him with his new duties and outlining his work for the first few weeks.

Mr. Harry L. Denison, Forest Ranger for the Kohala Mt. and Hamakua Pali Forest Reserves, Hawaii, in co-operation with the Forestry Division of the H. S. P. A. began his new duties on the first of the month.

#### FOREST RESERVE CHANGES.

On June 9, the forest reserve hearing to consider certain changes in five forest reserves, detailed in my May report, was held and no one appeared to present any objections to the changes. The proclamations were accordingly sent to the Governor, who signed them on June 21.

#### PROPOSED RULE 5.

On June 9, following the forest reserve hearing, a hearing to consider arguments for and against the adoption of proposed Rule 5 of the Division of Forestry was held, and was well attended by both those in favor of and those opposed to the rule, which proposes the forbidding of tramping on the important steep watersheds at the head of Palolo and Manoa Valleys. The grave danger of the ruination of the native forest by the spread of Hilo grass brought in and scattered along the trail by the feet of trampers was pointed out by experts and opposed to this were the arguments that the Olympus-Konahuanui trail should be kept open as a tourist asset and for the use of local recreationists. The minutes of this hearing are transmitted herewith for your information. I respectfully request that the matter be given your careful consideration and, in the interest of protecting this most important city watershed, I again strongly recommend the adoption of Rule 5 as already presented to you.

#### MAUI TRIP.

From June 14 to 16, I was at Wailuku, Maui, as a witness for the Territory in the case of cattle stealing, Territory of Hawaii vs. Charles E. Thompson.

#### HAWAII TRIP.

From June 24 to 26 I made a trip to Hilo and Kilauea in company with the President and Chief Plant Inspector, during which a number of matters were investigated and several conferences held. Plans for moving the Hilo nursery to the Animal Quarantine Station grounds and for its enlargement were discussed on the ground with Dr. Elliot and Bro. Matthias Newell, and it was decided to proceed with the work as soon as possible. To provide for expansion and secure ground for testing out trees by the establishment of an arboretum, it



was found desirable to add the adjacent 13-acre tract of land to the nursery and a request was made of the Commissioner of Public Lands to have this area set aside by Executive Order for the use by this Board for this purpose. Conferences with representatives of the Hilo Board of Trade and County Supervisors brought forth opinions in favor of this plan. A possible new site for a plant fumigation building near Kuhio wharf was examined. Personal instructions were given to Ranger Harry L. Denison concerning his new forest work in the Kohala mountains. An examination of the area at 29 Miles treated for the fern weevil disclosed the presence of a very few weevils in the center of the infection, but none on the borders. These few were found on young sadleria fern sprouts and were at once destroyed. Ranger Mackenzie was instructed to watch out for these and to destroy all young fern sprouts as soon as discovered. A long conference was held with Ranger Mackenzie on the work in his district and the details for the reconstruction of the ranger cabin on the Koa Grove lot at 29 Miles were discussed. With the Land Commissioner I also went over the boundary of a proposed addition to the National Park near the Volcano House, at the request of the Park authorities.

Several trips were made during the month to the Pupukea Forest Reserve on Oahu with a Government surveyor to determine the location of certain boundary borders preparatory to setting up permanent monuments and starting co-operative tree planting.

Work was started on the thinning out of several ironwood trees on the road in Nuuanu leading to the Pali. These were crowding out other more desirable trees, and on account of their size were in danger of falling and becoming a menace to traffic.

The last few days of the month were spent partly in preparation for the July trip to Kauai, which was planned for the purpose of investigating several forest matters, and starting the Kokee Campers in properly.

Respectfully submitted,

C. S. JUDD,  
Superintendent of Forestry.

## REPORT OF FOREST NURSERYMAN.

Honolulu, July 21, 1920.

Superintendent of Forestry, Honolulu, T. H.

Sir:—I herewith submit a report of the principal work done during the month of June, 1920:

### NURSERY.

#### Distribution of Plants—

Sold .....	120 pot grown plants
Gratis . . . . .	662 pot grown plants
Total .....	782 pot grown plants

### COLLECTIONS.

#### Government Realizations.

Collections on account of plants sold.....	\$ 3.15
Collections at sub-nursery, Kauai .....	15.00
Rent of Office Building, Nursery Grounds for May.....	35.00
Total .....	\$53.15



## PRESERVATION FOREST RESERVES.

## Rents and Fees.

Rent of Premises at Half-Way House, Tantalus, for quarter ending June 30th, \$10.00 per month .....	\$ 30.00
Fee for use of land and gathering ti leaves on Kalawahini, Paoa Valley, for quarter ending June 30th, \$12.50 per quarter .....	12.50

## Na Pali Kona Forest Reserve.

Fee for campsites Nos. 48 and 49, to Dec. 31, 1920—	
L. D. Larsen .....	\$ 3.50
Fee for campsites Nos. 16 and 17, to Dec. 31, 1920—	
Zella M. Breckenridge .....	\$ 11.00

## Black Sand from Makiki Sand Pit.

124 loads of black sand at \$0.50 per load.....	\$ 62.00
	<hr/>
	\$119.00

## SEED COLLECTING.

The seeding season for a large number of trees in and around the city is now on, and the two boys are kept busy collecting and sorting. The koa trees on Tantalus are also seeding freely this year, and we expect to be able to collect a number of pounds of this seed before the insects have time to destroy it.

## MAKIKI STATION.

The work done at this station has been principally routine. We are getting ready a large assortment of plants for the coming planting season.

## HONOLULU WATERSHED PLANTING.

Trees planted amounted to 350 Australian Red Cedar (*Cedrela Australis*) on land around the pond site adjoining the Waterhouse property.

## HILO SUB-NURSERY.

Brother M. Newell in his report for June gives the number of trees distributed at 236 in transplant boxes.

Joe Rita, Jr., reports the distribution of 830 trees in tin cans.

The report from Maui sub-nursery has not arrived.

## ADVICE AND ASSISTANCE.

The writer made the following number of calls and otherwise gave advice and assistance, at the request of people in and around the city:

Calls made .....	8
Advice by telephone .....	5
Advice to people calling .....	10

Very respectfully,

DAVID HAUGHS,  
Forest Nurseryman.

# Division of Entomology

Honolulu, July 24, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu, Hawaii.

Gentlemen:—During the month of June, the insectary handled 14,300 pupae of the melon fly, from which there were bred 2,271 females and 1,728 males, *Opius fletcheri*.

The distribution of parasites was as follows:

## MELON FLY PARASITE.

### *Opius fletcheri*.

	Female.	Male.
Oahu:		
Kaimuki . . . . .	75	75
Kailua . . . . .	1,100	1,050
Kauai:		
Kealia . . . . .	250	200

## FRUIT FLY PARASITES.

### *Diachasma tryoni*.

Oahu:		
Kaimuki . . . . .	230	200
Anapuni Street . . . . .	100	100
Nuuanu Avenue . . . . .	100	100
Maui:		
Kula . . . . .	100	100

### *Diachasma fullawayi*.

Oahu:		
Nuuanu . . . . .	60	60
Kaimuki . . . . .	100	100
Maui:		
Kula . . . . .	80	80

### *Dirhinus giffardi*.

Oahu:	
Anapuni Street . . . . .	100
Nuuanu Avenue . . . . .	400

### *Opius humilis*.

Oahu:	
Nuuanu . . . . .	100

### *Galesus silvestri*.

Oahu:	
Nuuanu . . . . .	500

### *Tetrastichus giffardianus*.

Oahu:	
Nuuanu . . . . .	500
Maui:	
Kula . . . . .	400

Respectfully submitted,

D. T. FULLAWAY,  
Entomologist.

## Division of Plant Inspection

Honolulu, June 30, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—I respectfully submit my report of the work carried on by the Division of Plant Inspection for the month of June, 1920, as follows:

During the month 76 vessels arrived at the Port of Honolulu, 24 of which carried vegetable matter and 10 vessels came through the Panama Canal Zone. The following disposal was made of the various shipments:

Passed as free from pests.....	1,063 lots	14,357 packages
Fumigated . . . . .	16 “	17 “
Burned . . . . .	91 “	194 “
Returned . . . . .	7 “	7 “
<hr/>		<hr/>
Total Inspected.....	1,177 “	14,845 “

Of these shipments 14,153 packages arrived as freight, 155 packages as mail and 177 packages as baggage.

### RICE AND BEAN SHIPMENTS.

During the month 31,095 bags of rice from Japan, 420 matts of rice from China and 3,512 bags of beans from Japan arrived and were found free from pests.

### PESTS INTERCEPTED.

Approximately 4,908 pieces of baggage belonging to immigrants from foreign countries were examined, from which 41 lots of fruit and 24 lots of vegetables were seized and destroyed.

On June 15, two packages of plants came by express from California and being infested with *Aphis* were fumigated.

On June 16, 9 lots of plants, one lot rice paddy, and one lot of corn, found in the baggage of immigrants from the Orient were seized and destroyed. One package of seeds, also belonging to an immigrant was seized and destroyed on account of weevil indications. A package of pili nuts in the mail from Manila was fumigated on account of ants. A package of seeds from Java for Dr. Lyon was fumigated precautionarily. Three packages of seed, a package of taro, a lot of grass plants and a package of beans, all from Japan, as well as a package of Betel nuts from Manila and a package of seeds from China, were fumigated precautionary.

On June 20, a lot of mangosteens in possession of one of the crew on the Santa Cruz from China, for a party in Honolulu, were refused entry and ordered kept on the steamer.

On June 21, per Makura, Mr. Fred Muir returned with two cages containing soil and sugar cane plants on which he imported parasites for the cane leaf hopper. These cages were opened at the H. S. P. A. Experiment Station in my presence in their quarantine room, and later all soil and cages were fumigated, and I then brought them to my department and the soil, packing and cane plants were destroyed by burning.

On June 22, per Matsonia, four boxes of peaches were burned, being infested with peach worm. Notice was sent to the shipper regarding future shipments.

On June 22 per Nanking, in the baggage, a plant and a package of taro were seized and destroyed. A lot of peas also in the immigrant baggage was burned on account of weevils.

On June 23, per Colusa, two packages of potato seed from France, were seized and destroyed, being prohibited.

On June 23, per Siberia Maru, a package of bulbs in the baggage of an immigrant and seven lots of plants belonging to passengers were seized and destroyed. A lot of Betel nuts from Manila were fumigated precautionary.

On June 29, per Manoa, 20 boxes of peaches were destroyed on account of peach worm.

On June 30, per Sonoma, two packages of grass seed in the mail from Sydney were fumigated precautionary.

#### HILO INSPECTION.

Brother M. Newell, Inspector at Hilo, reports the arrival of six steamers at the Port of Hilo. Four carried vegetable matter consisting of 239 lots and 1,945 parcels, all clean with the exception of one lot of turnips, which were wormy. These were destroyed.

#### KAHULUI INSPECTION.

Mr. Will J. Cooper, Inspector at Kahului, reports the arrival of seven vessels at the Port of Kahului. Two carried vegetable matter consisting of 14 lots and 534 parcels, all clean.

#### INTER-ISLAND INSPECTION.

Fifty-six steamers plying between Honolulu and the other Island ports were attended, and the following shipments passed as free from pests:

Taro . . . . .	583 bags
Vegetables . . . . .	390 pkgs
Fruit . . . . .	342 pkgs
Sugar Cane . . . . .	21 cases
Plants . . . . .	105 pkgs
Seeds . . . . .	3 pkgs
Total . . . . .	1444 pkgs

Fifty-one packages of plants (which includes Spanish Moss on leis) were refused shipment on account of infestation, undesirable soil, and not complying with the regulations.

During the month I visited Hilo in company with the President and Executive Officer of the Board to look into the matter of erecting a fumigating plant at Hilo. This matter will be taken up later on after a certain location has been secured. I also visited Maui at the request of the President of the Board, and went over the work of the local Inspector at Kahului. Everything is being done to protect the Island from infested fruit and plants from the Mainland. During my brief stay I made a search for the fern weevil and inquired from many if any damage to house ferns had been noticed. Nothing has been noticed nor reported, and I did not find any indications as far as I went. However, I believe that further search should be made in the very near future, not only on Maui, but on the other Islands.

Respectfully submitted,

E. M. EHRHORN,  
Chief Plant Inspector.



## Division of Animal Industry

Honolulu, July 20, 1920.

Board of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—I have the honor to submit the following report for the month of June:

### TUBERCULOSIS CONTROL.

From the appended report of the Assistant Territorial Veterinarian, it will be noticed that 20 head of cattle were condemned out of a total of 161 tested. The entire number of condemned cattle came from the Wailupe ranch.

In the round-up for injections a total of 157 animals were brought in. Of this number 52 were injected for the first time as determined by absence of tags or ear perforations.

While it cannot be said that the entire 52 head were not present at the time of the first test in November, 1919, it is certain that at least 40 head were of testable age, six months or over, at that time and would have been tested had the round-up been complete.

At this second test at the round-up for examination 147 out of the original 157 were brought in as determined by actual count, leaving a balance of 10 injected animals still in the valleys. Considering the number condemned out of what were brought in at the second round-up it is practically certain that one or more animals in this 10 head showed a reacting to the test, and were left on the premises to continue as a known source of infection to the balance of the herd.

Post-mortem examination of the condemned cattle showed three cases of generalized tuberculosis of the most virulent type, necessitating the condemnation of the entire carcass. Cases of this nature rapidly disseminate the disease among a herd even when they do not come in close contact as with stabled animals. Hence the great importance of making the round-ups as complete as possible, and the holding of all injected animals until the examination is over.

These conditions may be remedied somewhat when the new regulations are put in force. However, a more complete spirit of co-operation on the part of the owner is of more direct benefit and assistance to the work in hand than letters of law.

### SWINE PLAGUE.

A small outbreak of this disease occurred among hogs at Kuliouou. Prompt administration of vaccine checked the disease entirely and confined the loss to three head.

Respectfully submitted,

VICTOR A. NORGAARD,  
Territorial Veterinarian.

### REPORT OF ASSISTANT VETERINARIAN.

Honolulu, July 10, 1920.

Dr. V. A. Norgaard, Chief, Division of Animal Industry, Bureau of Agriculture and Forestry, Honolulu.

Sir:—I beg to submit the following routine report for the month of June, 1920:

### TUBERCULOSIS CONTROL.

The following cattle were tested during the past month:

	Tested.	Passed.	Condemned.
Francis Gay .....	1	1	0
A. Perry .....	157	137	20
Waialae Ranch .....	3	3	0

A total of 161 cattle were tested, out of which number 141 were passed and 20 condemned and branded.

Twenty-nine condemned and branded cattle were autopsied at local abattoirs. Positive lesions of tuberculosis were found in each case.

### LIVE STOCK IMPORTATIONS.

During the month 44 vessels were boarded by the inspector, and the following found to carry livestock for this Territory:

S. S. Manoa, San Francisco: 17 crates poultry.

S. S. Hyades, San Francisco: 3 crates poultry.

S. S. Maui, San Francisco: 1 crate cats, E. H. Magoon; 1 crate poultry.

S. S. Venezuela, Orient: 3 chow dogs, W. A. Ramsey; 1 Boston Bull Ter., E. Fernandez.

S. S. Seiyo Maru, Orient: 1 crate poultry.

S. S. Korea Maru, San Francisco: 1 dog, Mrs. R. P. Spaulding.

S. S. Wilhelmina, San Francisco: 1 Boston Bull Ter., L. A. Whitney; 2 white collies; 2 crates poultry. Amer. Ry. Ex. Co.

S. S. Wilhelmina, San Francisco: 10 crates poultry.

S. S. Tenyo Maru, Orient: 1 Airedale, J. H. Baker; 2 chow dogs, A. E. Evans; 1 crate poultry.

S. S. Lurline, San Francisco: 12 mules, City Mill Co.; 52 mules, F. H. Locey; 20 mules, American Factors; 23 horses, F. H. Locey; 8 horses, Haw. Dredging Co.; 1 horse, L. D. Warren; 3 Berkshire Sows, Kam. School; 36 crates poultry.

S. S. Siberia Maru, Orient: 3 crates poultry; 1 crate Parrots.

Sch. Puako, Africa: 1 English Bull Dog, James Rolph.

S. S. Dellwood, San Francisco: 1 Fox Terrior, Wm. Skelton.

S. S. Sonoma, Sidney: 1 Airedale pup, Mr. McWayne.

S. S. Manoa, San Francisco: 22 crates poultry.

Respectfully submitted,

LEONARD N. CASE,  
Assistant Territorial Veterinarian.

## By Authority

### TERRITORY OF HAWAII BOARD OF AGRICULTURE AND FORESTRY. DIVISION OF ANIMAL INDUSTRY.

#### REGULATIONS GOVERNING THE APPRAISEMENT OF TUBERCULOUS CATTLE AND EXPENDITURES ON ACCOUNT OF THE CONTROL AND ERADICATION OF BOVINE TUBERCULOSIS.

Under authority conferred by law upon the Board of Commissioners of Agriculture and Forestry, the following regulations are hereby promulgated to supplement and define the provisions of Act 204 of the 1919 Session Laws governing the slaughter of animals and expenditures on account of the control and eradication of bovine tuberculosis, which for the purposes of identification shall be known as D. A. I. Order No. 1.

## REGULATION I.—DEFINITIONS.

For the purposes of these regulations the following words, names and terms shall be construed, respectfully, to mean:

Sec. 1. Animals .....	Cattle.
Sec. 2. Disease .....	Bovine tuberculosis.
Sec. 3. The Board .....	Board of Commissioners of Agriculture & Forestry.
Sec. 4. Officer of the Board.....	Territorial Veterinarian.
Sec. 5. Territorial Veterinarian..	Refers to and includes the Assistant Territorial Veterinarian and the Deputy Territorial Veterinarians stationed on other islands.
Sec. 6. Reactor .....	An animal proven by the tuberculin test to be affected with tuberculosis.
Sec. 7. Co-operation .....	Compliance on the part of the owner with all rules and regulations issued by the Board pursuant to the control and eradication of bovine tuberculosis.

## REGULATION II.—APPLICATION OF TUBERCULIN TEST.

Sec. 1. All dairy cattle within this Territory more than six months old, and all cattle suspected of being affected with tuberculosis, shall be tuberculin tested by the Territorial Veterinarian.

Sec. 2. All cattle so tested shall be ear marked with a registered design at the time of injection and the reactors branded as by law prescribed.

## REGULATION III.—OWNER'S CO-OPERATION.

Sec. 1. The owner shall co-operate with the Territorial Veterinarian by facilitating his access to the cattle to be tested. He shall provide stanchions, chutes and holding pens, attend to the confinement of the cattle therein at such time, and in such manner as required by the Territorial Veterinarian, and shall supply whatever assistance the Territorial Veterinarian may deem necessary for the safe and effective application of the test.

Sec. 2. The owner shall further co-operate in carrying out the purposes of this law, by keeping his premises in a clean and sanitary condition. By this is meant that stables, sheds and enclosures be kept as by the Sanitary Code of the Territory required. Paddocks and pastures shall be rendered sanitary by the removal of all tuberculous animals (reactors) and of all other animals which have not by the tuberculin test been proved to be free from the disease.

Sec. 3. The owner shall immediately segregate and subsequently deliver for slaughter all reactors at such time and place as may be designated by the Territorial Veterinarian.

## REGULATION IV.—APPRAISALS AND CLAIMS.

Sec. 1. The appraisal of condemned animals (reactors) shall be in accordance with Sec. 2 of Act 204, S. L. 1919.

Sec. 2. When so required by this Board and for the purpose of co-operating with the Federal Bureau of Animal Industry, the appraisals shall be reported on forms furnished by the said Bureau (T. E. Form 23 Revised) in triplicate. Such reports of appraisals shall show the number of animals, the value of each per head and shall be signed by the owner, and the appraiser or appraisers, and approved by the Ter-

ritorial Veterinarian. These reports shall further show the amount paid or to be paid by the Territory for said animals, and shall be signed by the President of the Board of Agriculture and Forestry. The claimant shall further certify that the appraisal is accepted by him and that the amounts due him from the United States and the Territory are correct. One copy of these reports shall be submitted to the Federal Bureau of Animal Industry, one copy to the Territorial auditor, and one copy retained by the Territorial Veterinarian.

Sec. 3. When co-operating with the federal Bureau of Animal Industry, reports of appraisal and claims for indemnification shall be made on forms furnished by this Board and in accordance with Sec. 4 of Act 204, S. L. 1919.

#### REGULATION V.—DISPOSAL OF CONDEMNED ANIMALS.

Sec. 1. All condemned animals shall be segregated and slaughtered within thirty (30) days after appraisal, except in certain cases where, in the opinion of the Territorial Veterinarian, an extension of time should be allowed. The slaughter and inspection shall be under the direct supervision of the Territorial Veterinarian and in accordance with the meat inspection regulations of the federal Bureau of Animal Industry.

Sec. 2. After slaughter and inspection, the owner shall see that the carcass, or such parts thereof which are found to be wholesome, is sold at the best price obtainable for that class of meat and shall obtain from the purchaser a certificate, made out on forms furnished for the purpose, stating the dressed weight, price per pound and the total amount of money paid for the carcass.

Sec. 3. When co-operating with the Federal Bureau of Animal Industry a report of the salvage derived from the sale of condemned animals shall be made on the T. E. Form 24, furnished by said bureau, and signed by the purchaser or his agent. One copy of this report shall be submitted to the United States Bureau of Animal Industry with the claim and one copy retained by the Territorial Veterinarian.

#### REGULATION VI.—INDEMNIFICATION.

Sec. 1. The amount of indemnification shall be based upon the results of the post-mortem inspection and shall be in accordance with the provisions of Sec. 4 of Act 204 of the 1919 Session Laws.

Sec. 2. When co-operating with the United States Bureau of Animal Industry the federal share of the indemnification shall be compounded on the full appraised value of the condemned animals without deducting twenty or fifty per cent as by Act 204, 1919 Session Laws, Sec. 4, paragraphs b and c required.

#### REGULATION VII.—DISINFECTION.

Sec. 1. Whenever necessary, in order to prevent the spread of tuberculosis, materials contaminated by, or exposed to the disease, including barns, stables, sheds, pens, barn-yards, and other enclosures where diseased cattle have been kept, also cars and other conveyances, shall be disinfected under the supervision of the Territorial Veterinarian.

Sec. 2. All expense connected with such disinfection shall be borne by the owner.

#### REGULATION VIII.—CLAIMS NOT ALLOWED.

Sec. 1. No payment shall be made for any animals destroyed on account of tuberculosis unless such claim be executed upon vouchers, approved by the President of the Board of Agriculture and Forestry and supported by the forms required by these regulations.

Sec. 2. No claim shall be allowed arising out of the condemna-



tion of cattle on a tuberculin test applied by other than an officer of the Board or of the federal Bureau of Animal Industry, of improving the dairy and beef breeds of cattle in the Territory of Hawaii, encouraging recognition of the importance of maintaining such herds free from tuberculosis, and promoting the interchange of healthy pure-bred cattle, agree, so far as available funds permit, to co-operate in assisting breeders of such cattle to eradicate tuberculosis from their herds and to maintain officially Tuberculosis-free Accredited Herds.

Sec. 2. Co-operation with the Federal Bureau of Animal Industry shall be in strict accordance with their regulations on the subject.

These regulations shall become effective upon approval by the Governor.

Approved this 6th day of July, 1920.

C. J. McCARTHY,  
Governor of Hawaii.

Honolulu, Hawaii.

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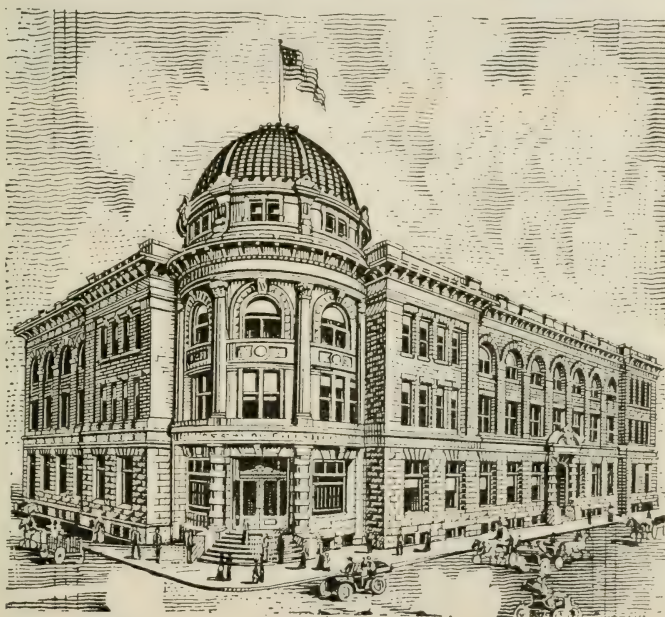


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# THE HAWAIIAN FORESTER AND AGRICULTURIST

SEPTEMBER, 1920

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It is desired to bring to the attention of bee-keepers and others the provisions of Rule 4 of the Board pertaining to the importation of queen bees, which it has been decided to enforce strictly henceforth. Facilities have been provided at the Government Nursery for quarantining such importations, but as it is not possible to handle large numbers of queens at one time in the most satisfactory manner, the number imported at any one time should be limited, and the notice of intention to import

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should be given, without fail, so that arrangements can be made to care for them. The period of quarantine will be about one month, or sufficiently long to permit brood to be formed and inspected.

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Mr. Daniel Langford, who has been employed in the Division of Plant Inspection of this Board for the past eleven years, has resigned his position to accept a more lucrative one in the Orient. We extend to Mr. Langford our best wishes for success in his new work.

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A supply of the U. S. Department of Agriculture Yearbook for 1919 has been received by this Board from Representative Kalaniana'ole and copies may be obtained by addressing The Librarian, P. O. Box 207, Honolulu, or by calling at the Government Nursery, King Street.

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The first installment of an article on "The Protection of Live Stock in Hawaii Against Infectious and Contagious Diseases," by the Territorial Veterinarian, is contained in this issue.

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## THE PROTECTION OF LIVE STOCK IN HAWAII AGAINST INFECTIOUS AND CONTAGIOUS DISEASES—(1).

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By VICTOR A. NORGAARD, *Territorial Veterinarian.*

The 1919 Territorial Legislature passed an act to provide a revolving fund for the Board of Agriculture and Forestry to supply preventive and curative serum, vaccine, bacterin and other remedies for the control and suppression of transmissible diseases among the live stock and other animals in the Territory of Hawaii.

The act appropriated the sum of \$5000.00 to be known as the "Animal Industry Revolving Fund," and provided that the Board shall purchase supplies of the above-mentioned remedies and shall upon recommendation of the Territorial Veterinarian furnish these remedies to owners of diseased or exposed live stock at actual cost, the proceeds of such sales to be returned by the treasurer of the Territory to the said revolving fund.

The purpose of the act was therefore primarily to obviate the distance between Hawaii and the mainland, or, rather, the base of supply of such remedies, and to enable the Territorial Veterinarian to take immediate action in any sudden outbreak of disease, without having first to cable and then await the arrival of such remedies, the epidemic meanwhile gaining in both morbidity and mortality; and as a majority of these remedies deteriorate or lose their effectiveness with age they could not be carried in stock advantageously by dealers or druggists except at greatly advanced prices.

In order that stock raisers and breeders, as well as veterinarians, may be in a position to take advantage of the provisions of this act, it is necessary that they should know the kind and nature of the remedies which the Board keeps on hand, and should be more or less familiar with the general manifestations or symptoms of the diseases to which these remedies may be applied. As the act provides that the remedies "shall be administered by the territorial veterinarian, his assistant or deputies," it will in all cases be necessary for stock owners to have their diagnosis confirmed by one of these officers, who will then take immediate action in securing and applying the required remedy.

The Board now keeps in stock supplies of the following biological products:

*Anthrax.* This disease, which affects practically all domestic animals as well as man, became prevalent on Kauai, Oahu and Maui at the time of the entry of the United States into the world war, and was undoubtedly introduced here by alien enemies.

The aim must have been the destruction of the Territory's abundant meat supply, and this end might have been attained to a greater degree than occurred had it not been for the success of the scientists of the federal Bureau of Animal Industry in perfecting a new anti-anthrax serum vaccine treatment shortly before. When the outbreaks occurred this new treatment had just become available commercially and proved so efficacious that the disease was speedily suppressed and with insignificant losses after its application.

Since that time only a very few cases have occurred in Kauai, where the first infection took place, and none on either Oahu or Maui. There is, therefore, little cause for going into detail regarding this disease. It had never occurred here before, and probably never will again, as most of the country where the infection was planted is unsuited for its propagation. Vaccination is, nevertheless, practiced once a year of all live stock on the ranch where the original outbreak took place, and the Board keeps on hand a stock of both serum and vaccine sufficient to meet any emergency, however remote it may be.

Cattlemen and stock raisers should bear in mind that any sudden death of either horses, mules, cattle or sheep where the carcass shows bloody discharge from the natural openings is suspicious of anthrax and should be reported without delay to the nearest veterinarian. Incision of the carcass should be avoided until his arrival. If on post-mortem examination the blood is found to be almost black and tarry and does not clot (coagulate) and turn bright red when exposed to the air, and when at the same time the spleen is found to be enlarged, there is every reason to suspect anthrax.

*Anthrax vaccine* (double), requiring two injections of 1 cc. each with an interval of ten days, after which immunity may be expected to occur a week or ten days after the second injection.



costs ten to fifteen cents per double dose. It has no curative properties and will hasten the appearance of the disease in an infected animal.

It is therefore of importance when this method of immunization is employed that vaccination of all exposed live stock be finished well ahead (two to three weeks) of the setting in of warm weather—the time when deaths begin to occur—or, as it is called in infected localities, the anthrax season. It should not be used after the animals have actually begun dying from anthrax.

*Anti-anthrax serum vaccine*, known as “the simultaneous method,” consists in the injection of 10 cc. of anti-anthrax serum on one side and 1 cc. of a strong anthrax vaccine on the other side of the animal. The serum, which is obtained from horses hyperimmunized through repeated and increasing doses of anthrax virus, has strong preventive and curative properties and renders negligible the danger of causing anthrax with the stronger vaccine injected at the same time. It therefore confers immediate protection, and the two together establish what is known as an active immunity against the disease.

The anti-anthrax serum, owing to the fact that it requires for its production sound live horses which must be kept under treatment for months at the time—and some of the larger manufacturers keep on hand hundreds of horses in porcelain-lined, steam-heated, hygienic and sanitary stables for this purpose only—and to the further fact that for preventive purposes the serum must be given in doses ten times as great as the vaccine, and for curative purposes in doses of 100 cc. or more, it is easily understood, is a more expensive product than the vaccine, which is made in the bacteriological laboratory by inoculating flasks containing the proper culture media, such as bouillon, and after the anthrax bacteria have attained the requisite growth, attenuate (weaken) them by heat, standardize them as to strength, add a preservative, bottle, label and market.

Hence the vaccine, as stated, costs 10 cents per dose, even the double vaccine, while the simultaneous treatment—1 cc. vaccine and 10 cc. serum—costs from 30 cents to 35 cents per dose, and a curative treatment of serum alone (100 cc.) costs \$2.50 to \$3.00.

(*To be continued.*)

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## DIVISION OF FORESTRY.

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### REPORT OF THE SUPERINTENDENT OF FORESTRY, JULY, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu.

Gentlemen:—I respectfully submit the following routine report of the Division of Forestry for the month of July, 1920:



## KAUAI TRIP.

From July 2 to 24, I was on the Island of Kauai making a general inspection of forest matters and spent considerable time in the region of the Kokee Camps to make sure that the campers were properly informed and complied with the sanitary requirements. At the time of my visit there were about 75 campers in the Kokee region enjoying the cooler climate to be found there. With the Chief Sanitary Inspector of the Board of Health I made inspections of all the camps and, with the exception of two, all were found to be in good sanitary condition and certificates to this effect were issued by the Inspector. In the two camps mentioned, garbage holes had to be dug and in one a toilet had to be further removed. These matters were being attended to when I left.

One day was spent with the special committee, appointed by the Kauai Board of Supervisors, which has charge of the management of the Puu Ka Pele Park, in going over the park area, selecting sites for community house, camp sites, etc., and assisting in plans for the development of the park. Water is being laid on to the park area by the construction of a pipe line which will lead the water from Halemanu Stream along the edge of the Waimea Canyon, going through the canyon rim in a tunnel now being constructed. The project will be in readiness for the next camping season.

New trails to make the canyon views more accessible were located and will be built by private parties.

It will be of general interest to note that the rainbow trout planted last spring in the Kokee Stream by the Fish and Game Commission are thriving and have attained a length of almost two inches.

On account of the removal of all wild cattle from the Halemanu and Kokee region, the undergrowth and young trees are coming up thickly over a large part of the forest and the forest in general is coming back to normal in a satisfactory manner. The goats, while still numerous on the canyon cliffs, are not encroaching upon the forest areas and are being held in check by the hunters.

An inspection was made of the nursery at Kalaheo in charge of Joe Rita, and it was found to be in a satisfactory condition. Over 3000 transplants were on hand ready to be set out and about 10,000 seedlings coming up. This nursery is able to supply the local demand for trees, and the output could be increased without added expense.

## HILO NURSERY.

Work was begun on the establishment of a new nursery in Hilo on the land adjacent to the Animal Quarantine Station in accordance with plans made by the Forest Nurseryman and approved by the President and myself. A pipe line 1500 feet long is being laid down, lumber for a potting shed and office has been ordered, and an extra laborer has been put on the work. The purpose of this expansion is to make a much larger number of trees available for distribution on Hawaii.

## MISCELLANEOUS.

A Ford machine has been ordered for Ranger Lindsay so as to aid him in his work of tree distribution and inspection of forest reserves on the Island of Maui.

Tree planting has continued during the month on Tantalus and at Mikilua, in the Lualualei Forest Reserve, Oahu.

The Assistant Superintendent has been engaged during the month in completing the location and monumenting of corners on the makai boundary of the Pupukea Reserve, Oahu, and in surveying out areas in

pineapple cultivation as a basis for cooperative tree planting to be begun this fall.

Respectfully submitted,

C. S. JUDD,  
Superintendent of Forestry.

# **REPORT OF THE ASSISTANT SUPERINTENDENT OF FORESTRY, AUGUST, 1920.**

Superintendent of Forestry, Honolulu, T. H.

Dear Sir:—I respectfully submit the following statement of my activities during the month of August:

During the first two weeks of the month considerable time was spent attending meetings of the Pan-Pacific Scientific Conference, particularly the meetings of the botany section. The discussions at these meetings were peculiarly valuable in bringing out original evidence of the relationships and derivation of the Hawaiian flora.

Some assistance was given the committee in transporting delegates to various places in the official car.

In company with Mr. Haughs, the submarine base at Pearl Harbor was visited for the purpose of discussing with the officers in charge the possibilities of improving the five-acre tract of the station by means of ornamental planting.

A trip was made over the Olympus-Konahuanui trail to observe the spread of Hilo grass in the forest of the Honolulu Watershed. Photographs were taken of one of the many places where the grass is in complete possession of the ground.

Several days were spent at Manoa Ranger Station, examining the plantations of introduced species set out in 1916-1917. Of over 105 species planted, more than 75% are quite successful, among the most promising being several eucalypts and the Philippine Molave (*Vitex parviflora*).

A tracing and blueprints were made from the base maps originally constructed by Mr. Judd in order to facilitate examination of the plantations and plans for their further development.

Work was begun on the preparation of tables showing the ownership and acreage of all private lands within the boundaries of the forest reserves.

A trip was made to Kolekole Pass, in the Waianae Mountains, where photographs were taken to show the progress of the planting on the slopes of Puu Kailio just below the pass.

Throughout the month considerable time was spent in studying the forestry files, publications of the Division of Forestry, and various periodicals and books in the Bureau library, for the purpose of becoming thoroughly familiar with the work of the Division.

Respectfully submitted,

CHAS. J. KRAEBEL,  
Asst. Superintendent of Forestry.

# **REPORT OF THE FOREST NURSERYMAN, JULY, 1920.**

Superintendent of Forestry, Honolulu, Hawaii.

Sir:—The following report gives the principal work done during the month of July, 1920:

## **DISTRIBUTION OF PLANTS.**

The number of plants distributed during the month amounted to 2517, including 620 sent to government forest reserves.

## COLLECTIONS—GOVERNMENT REALIZATIONS.

On account of sale of plants.....	\$ 1.65
Rent of office, nursery grounds, for June.....	35.00
Total .....	<u>\$36.65</u>

## SEED COLLECTING.

The collecting of seed is progressing. We have collected on Tantalus 55 pounds of clean koa seed, which is the largest amount on record for one season. We expect to have enough koa seed now to last us for several years. The assistance of the gang working on the watershed had to be secured for four days in collecting this seed. We are also collecting seed of Eucalyptus, Casuarina, Grevillea and the shade and ornamental trees.

## MAKIKI STATION.

The work done at this station, in addition to the regular routine, consisted of cutting up wood for boxes, making lattice, etc.

## HONOLULU WATERSHED PLANTING.

We have just finished planting around where the small pond used to be, adjoining the Waterhouse property. The slopes around the pond site have been planted with Australian red cedar (*Cedrela Australis*), 350 being planted in June and 485 in July, total 835. At the request of the property owners in the neighborhood, the pond part has been left undisturbed, the object being to try to make the pond hold water, so that it may, as in former years, add to the beauty of the surroundings. The vacant spaces in the watershed are gradually being covered with trees. A considerable area at the top of Makiki Main Valley still remains to be planted. The planting up of this part is very important, as the springs that supply the Makiki reservoir are located there. A dense forest around the spring heads, there is no doubt, might be the means of preserving and increasing the supply of water.

Another matter that should be considered at this time is fire protection. Many miles of trails have been made through the forest back of Honolulu for this very purpose. As the dry season is on, our trails should all be kept clear and put in good shape for the protection of the forest. A forest fire of a few hours' duration is liable to destroy the work of several years in tree planting.

## SUB-NURSERIES.

Hilo. Bro. M. Newell, in his report for the month, states that he distributed 717 plants in transplant boxes.

Maui. Mr. James Lindsay states that he distributed 339 assorted plants during the month.

Kauai. The report of this nursery has not yet been received.

## ADVICE AND ASSISTANCE.

In company with President Atkinson and Mr. Ehrhorn, a trip was made to Maui, the object of my visit being principally to look over the work done at our sub-nursery at Haiku. I found the nursery in good shape, with lots of young plants started for the coming planting season.

While on Maui we visited the nursery of the Wailuku Plantation Company and were shown by Mr. Penhallow the immense amount of work in tree planting that the company has done during the past eight or nine years.

A trip was also made to Hilo for the purpose of locating and deciding upon a new nursery at the Animal Quarantine Station. The location of

buildings and nursery has been arranged, and work will start at once in laying water pipes and erecting buildings, etc.

The writer has made ten visits, including one to the naval submarine and aviation base at Pearl Harbor and one to the arsenal at Fort Shafter, the balance being made at the request of people in and around the city.

Respectfully submitted,

DAVID HAUGHS,  
Forest Nurseryman.

## REPORT OF THE FOREST NURSERYMAN, AUGUST, 1920.

Superintendent of Forestry, Honolulu, Hawaii.

Dear Sir:—I herewith submit a report for the month of August, 1920:

### NURSERY.—DISTRIBUTION OF PLANTS.

Sold, pot-grown plants .....	153
Gratis, pot-grown plants .....	1637
Total number pot-grown plants.....	1790

### COLLECTIONS.—GOVERNMENT REALIZATIONS.

Collections on account of plants sold.....	\$ 3.75
Rent of office, Nursery grounds .....	35.00
Sale of plants at Kalaheo Nursery, Kauai .....	20.00
Total.....	\$ 58.75

### PRESERVATION, ETC., OF FOREST RESERVES.

Parker Ranch, rent of 73 acres of land in Hilo Forest Reserve near Keanokolu, August 12, 1919 - August 12, 1920.....	\$ 39.50
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### ANIMAL INDUSTRY REVOLVING FUND.

Abbie E. Macomber, 73 doses hemorrhagic septicemia vaccine at 11c .....	\$ 8.03
Mrs. Anna H. McCarthy, hemorrhagic serum .....	8.91
Hutchinson Sugar Plantation Co. and Waiohinu Agricultural & Grazing Co., 4934 doses hemorrhagic septicemia vaccine.....	542.74
18 bottles hemorrhagic septicemia at \$2.50.....	45.00
Total.....	\$604.68

### MAIKI STATION.

The work done at this station has been principally routine, consisting of mixing and sterilizing soil, transplanting seedlings into pots and boxes, etc.

### HONOLULU WATERSHED PLANTING.

The work done on the watershed consisted of the planting of 217 koa trees on land adjoining the Schmidt Estate, clearing off, etc.

### SUB-NURSERIES.

Haiku, Maui. Mr. James Lindsay reports the distribution, during the month of August, of the following number of trees:



In seed boxes .....	300
In transplant boxes .....	715
Total.....	1015

Kalaheo, Kauai. Mr. Joe Rita, Jr., reports that he distributed the following:

July .....	647 pot-grown trees
August .....	389 pot-grown trees

#### LUALUALEI, WAIANAE.

J. K. Luka reports the planting of trees for August as follows:

Ficus (five species) .....	200
Eucalyptus resinifera .....	2095
Australian red cedar .....	1340
Total.....	3635

#### ADVICE AND ASSISTANCE.

The writer has, at the request of people in and around the city, made calls and otherwise given advice and assistance as follows:

Calls made .....	6
Advice to people calling .....	8
Advice by phone .....	6

Respectfully submitted,

DAVID HAUGHS,  
Forest Nurseryman.

### DIVISION OF ENTOMOLOGY.

#### REPORT OF THE ENTOMOLOGIST, JULY, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu, Hawaii.

Gentlemen:—During the month of July the insectary handled 16,200 pupae of the melon fly, from which there were bred 2333 females and 2050 males, *Opius fletcheri*.

The distribution of parasites was as follows:

#### MELON FLY PARASITE.

	<i>Opius fletcheri</i> .	Females.	Males.
Oahu:			
Moiliili .....		350	300
Moanalua .....		200	200
Kailua .....		450	450
Hawaii:			
Kamuela .....		200	200
Hilo .....		100	100
Kauai: Kealia .....		100	100

## FRUIT FLY PARASITES.

*Tetrastichus giffardianus.*

Maui: Kula .....	750
Kauai: Kalaheo .....	500

*Diachasma tryoni.*

Maui: Kula .....	220	220
Kauai: Kalaheo .....	100	100

*Opius humilis.*

Maui: Kula .....	150	150
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*Diachasma fullawayi.*

Maui: Kula .....	220	220
Kauai: Kalaheo .....	100	100

*Galesus silvestri.*

Oahu: Nuuanu .....	400
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*Dirhinus giffardi.*

Oahu: Nuuanu .....	250
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## HORN FLY PARASITE.

*Spalangia cameroni.*

Oahu: Moanalua .....	800
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Respectfully submitted,

D. T. FULLAWAY,  
Entomologist.

## REPORT OF THE ENTOMOLOGIST, AUGUST, 1920.

Gentlemen: During the month of August the insectary handled 23,100 pupae of the melon fly, from which there were bred 3434 females and 2809 males, *Opius fletcheri*.

The distribution of parasites was as follows:

## MELON FLY PARASITE.

	Females.	Males.
<i>Opius fletcheri.</i>		
Oahu:		
Molili .....	400	350
Kalihi .....	1500	1000
Nuuanu .....	200	200
Hawaii: Kamuela .....	250	200

## FRUIT FLY PARASITES.

*Diachasma fullawayi.*

Maui: Wailuku .....	150	150
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*Galesus silvestri.*

Oahu: Nuuanu ..... 1000

*Dirhinus giffardi.*

Oahu: Nuuanu ..... 800

*Opius humilis.*

Maui: Wailuku ..... 100      100

*Diachasma tryoni.*

Maui: Wailuku ..... 200      200

*Tetrastichus giffardianus.*

Maui: Wailuku ..... 200

## HORN FLY PARASITE.

*Spalangia cameroni.*

Oahu: Moanalua ..... 1200

Respectfully submitted,

D. T. FULLAWAY,  
Entomologist.

## DIVISION OF PLANT INSPECTION.

## REPORT OF THE CHIEF PLANT INSPECTOR, JULY, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.

Gentlemen: I respectfully submit my report of the work carried on by the Division of Plant Inspection for the month of July, 1920, as follows:

During the month 63 steamers arrived at the port of Honolulu, 21 of which carried vegetable matter, and 9 vessels came through the Canal Zone. The following disposal was made of the various shipments:

Passed as free from pests.....	1426 lots	17,472 pkgs.
Fumigated.....	7 "	7 "
Burned.....	41 "	41 "
Returned.....	1 "	1 "
Total inspected.....	1475 lots	17,521 pkgs.

Of these shipments, 17,184 packages arrived as freight, 166 packages as mail and 171 packages as baggage.

## RICE AND BEAN SHIPMENTS.

During the month 11,637 bags of rice from Japan, 750 matts of rice from China and 1394 bags of beans from Japan arrived and were found free from pests.

## PESTS INTERCEPTED.

Approximately 1618 pieces of baggage belonging to immigrants from foreign countries were examined, from which 7 lots of fruit and 28 lots of vegetables were seized and destroyed.

On July 5 a package of mango seed found in the mail from Manila was seized and destroyed as contraband.

On July 7 a package of beans found in the mail from China was fumigated precautionary.

On July 8 the S. S. Tangaroa, from Fanning Island, brought 10 cases of empty bottles packed in straw in which two colonies of ants were found. From the condition of the straw, evidently these cases must have stood in a yard or near a landing for some time, as the straw was badly decayed and sow bugs, cockroaches and centipedes were found. The 10 boxes were placed on a truck on which a tarpaulin was laid, and hauled to the fumigating room and fumigated with carbon bisulphide.

On July 9 a lot of sandpears and two packages of corn were found in the mail from Japan, seized and destroyed. A package of beans and a package of vegetable seeds, also in the mail from Japan, were fumigated precautionary.

On July 11 a case of orchids brought from Manila by a passenger on the Marica was returned, being prohibited. A package of mango seed in the mail from Manila for the Board of Agriculture and Forestry was burned, being prohibited.

On July 17, two packages of dahlia bulbs from the mainland were fumigated on account of aphids.

On July 21 a package of seeds in the mail for Dr. Lyon, from the British Guiana Botanical Gardens, was fumigated precautionary.

On July 26 a lot of corn in the baggage of a passenger from the Orient was seized and destroyed as contraband. A package of dry beans in the mail from Japan was fumigated on account of weevils.

## HILO INSPECTION.

Brother M. Newell, Inspector at Hilo, reports the arrival of five steamers at the port of Hilo. Three carried vegetable matter, consisting of 194 lots and 2068 parcels, all clean.

## KAHULUI INSPECTION.

Mr. Will J. Cooper, Inspector at Kahului, reports the arrival of 10 vessels at the port of Kahului. Three carried vegetable matter, consisting of 16 lots and 816 parcels, all clean.

## INTER-ISLAND INSPECTION.

Sixty-two steamers plying between Honolulu and the other Island ports were attended and the following shipments passed:

Taro.....	540 bags
Vegetables.....	331 packages
Fruit.....	251    “
Plants.....	130    “
Seeds.....	1    “
Sugar cane.....	74 cases

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Total passed..... 1327 packages

Fifty-five packages of plants (which includes Spanish moss), as well as



four lots of sugar cane, were refused shipment on account of infestation, undesirable soil and not complying with the regulations.

Respectfully submitted,

E. M. EHRHORN,  
Chief Plant Inspector.

### REPORT OF THE CHIEF PLANT INSPECTOR, AUGUST, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—I respectfully submit my report of the work carried on by the Division of Plant Inspection for the month of August, 1920, as follows:

During the month 59 steamers arrived at the port of Honolulu, 23 of which carried vegetable matter and three vessels came through the Canal Zone. The following disposal was made of the various shipments:

Passed as free from pests.....	1658 lots	25,415 pkgs.
Fumigated.....	3 “	3 “
Burned.....	34 “	34 “
Total inspected.....	1695 lots	25,452 pkgs.

Of these shipments 25,132 packages arrived as freight, 180 packages as mail and 140 packages as baggage.

### RICE AND BEAN SHIPMENTS.

During the month 26,922 bags of rice from Japan, 10 matts of rice from China, and 2451 bags of beans from Japan arrived and were found free from pests.

### PESTS INTERCEPTED.

Approximately 4458 pieces of baggage belonging to immigrants from foreign countries were examined, from which 17 lots of fruit and 15 lots of vegetables were seized and destroyed.

On August 4 a package of seed in the mail from Australia for Dr. Lyon was fumigated precautionary.

On August 5 a package of bulbs found in the baggage of a passenger from the Orient was seized and held awaiting a permit from Washington.

On August 14 a package of limes for Port Allen from Mexico was seized and destroyed as contraband.

On August 20 a package of palm nuts in the mail was condemned as unmailable. A package of tree seeds in the mail from Manila for the Board of Agriculture and Forestry was fumigated precautionary.

On August 31 a package of peanuts found in the mail from Pago Pago was fumigated precautionary.

### HILO INSPECTION.

Brother M. Newell, Inspector at Hilo, reports the arrival of five steamers at the port of Hilo. Two carried vegetable matter, consisting of 143 lots and 2119 packages, all clean.

### KAHULUI INSPECTION.

Mr. Will J. Cooper, Inspector at Kahului, reports the arrival of seven vessels at the port of Kahului. Two carried vegetable matter, consisting of 18 lots and 1203 packages, all clean.

## INTER-ISLAND INSPECTION.

Fifty-six steamers plying between Honolulu and the other Island ports were attended and the following shipments passed:

Taro.....	623 bags
Vegetables.....	412 pkgs.
Fruit.....	260 “
Plants.....	119 “
Pine shoots.....	2289 bags
Seeds.....	4 pkgs.
Sugar cane.....	78 cases

Total passed..... 3776 pkgs.

Thirty-two packages of plants (which includes Spanish moss), 4 packages of fruit and 2 packages of sugar cane were refused shipment on account of infestation, undesirable soil and not complying with the regulations.

Respectfully submitted,

E. M. EHRHORN,  
Chief Plant Inspector

## DIVISION OF ANIMAL INDUSTRY.

REPORT OF THE ASSISTANT TERRITORIAL VETERINARIAN,  
JULY, 1920.

Dr. V. A. Norgaard, Chief, Division of Animal Industry, Bureau of Agriculture and Forestry, Honolulu.

Sir:—I have the honor to submit the following report for the month of July:

## TUBERCULOSIS CONTROL.

The following cattle were tested during the month:

	Tested.	Passed.	Condemned.
Waialae Dairy .....	3	3	0
Antone Pacheco .....	1	1	0
Waialae Dairy .....	29	28	1
Mrs. C. M. Cooke .....	1	1	0
Mrs. H. G. Isenberg .....	1	1	0
M. Rodrigues .....	2	2	0
M. Salado .....	12	12	0

A total of 49 head were tested out, of which number 48 were passed and 1 condemned.

Besides the above, autopsies were held on 20 head of condemned cattle; all of which were found to be affected with tuberculosis.

## HEMORRHAGIC SEPTICEMIA (SUIS).

An outbreak of this disease, commonly known as swine plague, was reported from Kuoloa Ranch. About a dozen had died previous to vaccination.

After post-mortem verification of the diagnosis, 53 head were vaccinated, Jen-Sal. Mixed Infection Bacterin (Suis) being used. Since then no further losses have been reported.

#### IMPORTATION OF LIVE STOCK.

The following classes of live stock were received during the past month: Horses, 3; mules, 25; cattle, 42; dogs, 5; poultry, 161 crates; rabbits, 7 crates; monkeys, 1.

The cattle importations consisted of 15 Ayrshires and 27 Holsteins, all pure-bred registered stock.

Thirty-two vessels were boarded and inspected.

Respectfully submitted,

LEONARD N. CASE,  
Assistant Territorial Veterinarian.

#### REPORT OF THE ASSISTANT TERRITORIAL VETERINARIAN, AUGUST, 1920.

Dr. V. A. Norgaard, Chief, Division of Animal Industry, Bureau of Agriculture and Forestry, Honolulu.

Sir:—I beg to submit the following routine report for the month of August, 1920:

#### TUBERCULOSIS CONTROL.

	Tested.	Passed.	Condemned.
H. J. Andrews .....	1	1	0
Ant. Pacheco .....	6	6	0
Wahiawa Dairy .....	36	33	3
Mrs. C. M. Cooke .....	1	1	0
Kualoa Ranch .....	6	5	1
E. H. Wodehouse .....	1	1	0
M. T. Brazon .....	3	3	0
M. Salado .....	2	2	0

A total of 56 head of cattle were tested during the month, of which number 52 were passed and four condemned and branded. All four condemned animals were recent importations from the Coast which were held for retest at the Quarantine Station. Post-mortem examinations of three of these animals revealed positive lesions of tuberculosis.

#### CONTAGIOUS ABORTION.

In the control of this disease 104 head of cattle were vaccinated with contagious abortion vaccine. These cattle were located in two widely-separated dairies.

Good results are apparently following the use of this vaccine, especially when used in herds where breeding records are kept. However, further time must elapse before we can report definitely on the value of this vaccine as a preventative.

#### IMPORTATION OF LIVE STOCK.

Forty-four vessels were boarded for inspection during the month, of which number ten were found to carry live stock destined for this Territory.

The following classes of live stock were imported during the month: Horses, 3; mules, 104; cattle, 58; goats, 66; dogs, 8; poultry, 128 crates.

Respectfully submitted,

LEONARD N. CASE,  
Assistant Territorial Veterinarian.

**J. M. DOWSETT**

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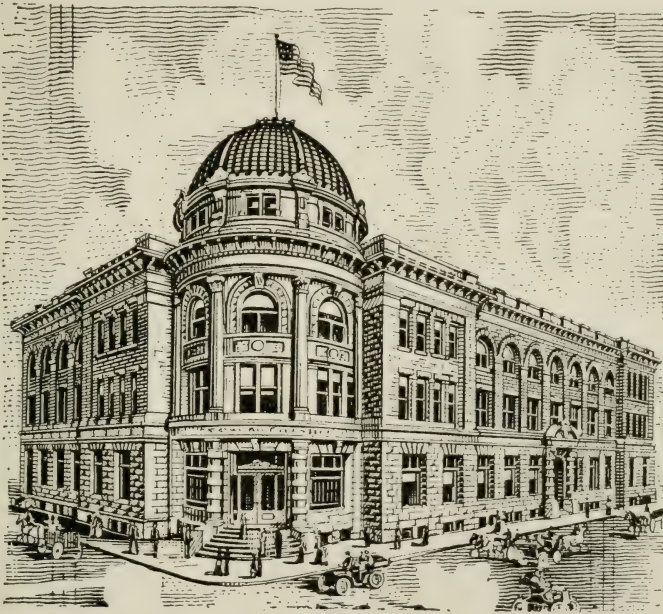


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# THE HAWAIIAN FORESTER AND AGRICULTURIST

OCTOBER, 1920

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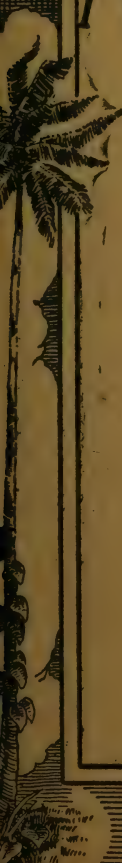
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# Board of Agriculture and Forestry

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The Division of Forestry maintains the following nurseries on the several islands from which seedlings of the common forest and ornamental trees may be obtained at cost:

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Trees for planting on Windward Kauai may be obtained from the Kapaa School by applying to Mr. Geo. S. Raymond, Principal.

HONOLULU, OAHU. Government Nursery, King Street, in charge of Forest Nurseryman David Haughs, Box 207, Honolulu. Fresh tree seed may also be obtained from this nursery.

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C. S. JUDD,  
Superintendent of Forestry.

## DIVISION OF ENTOMOLOGY.

To give information about insects free of charge is one of the duties of this Division, and Hawaiian readers are hereby invited to make inquiry in person and by mail. In order to be able to advise intelligently or send the right kind of useful insects for relief, we like and sometimes it is indispensable for us to see the insects suspected or caught in the act, also specimens of the injury. In a tin with a hole or two, or a wooden box, specimens may be mailed by parcels post. When specimens are not accompanied by letter, always write your name and address in the upper left-hand corner of the package. Address all communications, DIVISION OF ENTOMOLOGY, P. O. BOX 207, HONOLULU, HAWAII.

D. T. FULLAWAY,  
Entomologist.

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# THE HAWAIIAN FORESTER AND AGRICULTURIST

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VOL. XVII.

HONOLULU, OCTOBER, 1920.

No. 10

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An article in this issue on the termites or white ants by Entomologist Fullaway describes the four species found in Hawaii, the damage they do, and suggests methods of control.

Mr. Louis Gillin of Kahului, Maui, was on September 1, 1920, appointed Fruit and Plant Inspector for the Island of Maui under the Division of Plant Inspection to take the place of Mr. Will J. Cooper, resigned.

It is of interest to learn from the Forest Nurseryman's report that seed of the African tulip tree, one of the popular trees for ornamental planting, can now be obtained locally.

The recent importation of some very high grade cattle, as described in the Territorial Veterinarian's reports, should greatly improve the dairy stock in the Territory. The importance, however, of securing such stock from government accredited herds is also shown in the same reports.

In this issue the Territorial Veterinarian continues his series of articles on the protection of live stock in Hawaii and deals with the disease known as *hemorrhagic septicemia*.

Hawaii has enough insect pests, as everyone knows, but there are still many others which the Division of Plant Inspection is strenuously endeavoring to keep out of the Territory. These are indicated by the Chief Plant Inspector in an article in this issue.

The following resolution was passed by the Board at a meeting held on September 9, 1920:

"WHEREAS, the forests of the Hawaiian Islands are being depleted, due mainly to the ravages of stock, and it is necessary in many districts to reforest in order to conserve the rainfall for purposes of irrigation; and

"WHEREAS, certain trees of the genus *Ficus* are considered suitable for purposes of reforestation, and should give results in an appreciably short time providing means are found to insure their spread by natural agencies;

"THEREFORE, BE IT RESOLVED by the Board of Agriculture

that the plan proposed by the Hawaiian Sugar Planters' Experiment Station to investigate the role of the chalcid flies commonly known as fig wasps in the fertilization of the seed of certain species of *Ficus* with the intent of introducing one or more species of the said fig wasps into the Hawaiian Islands is, after due consideration of the views and opinions of the various naturalists consulted and heard from, approved, and the Chief Plant Inspector is hereby authorized and directed to permit the introduction of said insects under the usual guarantees as to safety from harmful consequences."

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## REPORT OF THE ASSISTANT SUPERINTENDENT OF FORESTRY, SEPTEMBER, 1920.

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October 14, 1920.

Superintendent of Forestry,  
Honolulu, T. H.

Sir:—The following statement of my activities during the month of September is respectfully submitted:

The first week was spent in the office at Honolulu, and the remainder of the month on an extended inspection of the forest reserves on the island of Maui.

On September 11, in company with Mr. Atkinson, Ranger James Lindsay and Mr. Sam Baldwin, Manager of Haleakala Ranch, a trip was made into the Makawao Reserve to examine the site of a small water development project, for which permission is requested by the Haleakala Ranch. It is proposed to run a short tunnel under the waterfall of Pali-o-ka-Moa and pipe the water down from that point. From the standpoint of forestry no harm will be done by this project and the Division of Forestry has no objection to its execution. Jurisdiction over water rights, is held by the Commission of Public Lands and Mr. Baldwin was referred to that office for further action.

In company with Ranger Lindsay, a general tour of Maui was then begun. The upper portion of the Makawao forest was first examined and found to be in very satisfactory condition. Thrifty young koa and ohia trees are growing abundantly among the old dead trees and the general cover of shrubs and ferns is vigorous and complete.

A five day trip was made around Haleakala following a route through the crater, out through Kaupo Gap, and over the Ditch Trail. On the climb to the Rest House a detour was made to examine the experimental plantation of temperate zone conifers. The trail, after leaving Kaupo, gave a good opportunity to see something of the Kipahulu, Hana and Koolau Reserves. While the Koolau forest is adequately protected by the Ditch company, the same is not true of the other two reserves, and there is urgent need of stock-proof fences along their makai boundaries. Under present conditions cattle may run at will into these forests from the guava-covered pastures immediately below. Before the onslaught of cattle and guava the forest is gradually retreating. The construction of fences along this boundary is among the most important forestry needs on Maui.

Along the Ditch Trail much young ohia is coming up among the dead trees, giving every promise of restoring this once luxuriant forest. Examination showed the young trees to be starting either upon the fallen trunks of tree ferns or from the bases of other dead trees. In the opinion of Dr. Lyon this means that the promising young forest is

only temporary and that as soon as the trees begin to thrust roots deeper into the toxic soil they will die in their turn just as the trees before them have died.

One day was spent riding over the Kula Reserve. The extreme upper portion of this reserve is quite barren, the intermediate altitudes have a considerable cover of mamani trees interspersed with kauau and other shrubs, which the lower levels, especially in the region of Polipoli spring, are rich grass lands. Owing to the prolonged drought on Maui, Mr. Harold Rice had been obliged during the past summer to turn several hundred head of cattle into that portion of the intermediate zone of the reserve which he owns in fee simple (Kaonoulu and Alae—1-2). Here the mamani showed the effects of browsing but the damage is neither severe nor lasting. On the whole the mamani seems to be increasing and spreading in Kula.

A trip was made to Ulupalakua Ranch where the old eucalyptus and cypress plantation on the surrounding hills were examined.

In company with Mr. Penhallow, the nursery and extensive plantings of the Wailuku Plantation were visited.

A request of the Pioneer Mill Company for tree planting advice was answered by a visit in company with Ranger Lindsay to Mr. Lyman, overseer at Puukolii. It was decided to have Ranger Lindsay examine the lands to be planted, determine the species to be used and then assist Lyman in establishing a nursery near the planting site. Seedlings will be started at Haiku nursery, but transplanting and all further work will be carried on by the plantation with Lindsay's advice. The Pioneer Company is anxious to do as much planting as possible on the slopes above their cane fields.

At the request of Mr. Angus MacPhee, a trip was made to Kahoolawe. Considering the drought which has prevailed for about two years, the vegetation on this desolate island is doing remarkably well. The algaroba is spreading in a very encouraging manner, but even more remarkable is the rapid spread of the Australian saltbush which was introduced a few years ago. This plant appears freshest and greenest of all the vegetation on the island, produces seed abundantly under the most severe conditions, is readily eaten by both cattle and horses and is not killed by grazing. The most difficult problem of this island is to get tree growth started on the wind-swept plateaus above an altitude of 800 feet. Here all the arable soil has been blown away and only the bare hard-pan remains. Mr. MacPhee proposes plowing furrows at strategic points, putting manure in the trenches and sowing algaroba seeds. If windbreaks can once be established in this way further planting will be much easier and cheaper. No better tree than algaroba could be used, but because of the hardness of the wattle that species was suggested to be tried in connection with algaroba.

Throughout the entire tour of Maui and Kahoolawe photographs of forest conditions were taken for the official album of the Division of Forestry.

Respectfully submitted,

CHAS. J. KRAEBEL,  
Assistant Superintendent of Forestry.

REPORT OF THE FOREST NURSERYMAN, SEPTEMBER, 1920.

October 13, 1920.

Superintendent of Forestry, Honolulu.

Sir:—I herewith submit a report of the principal work done during the month of September, 1920:

## NURSERY.

## Distribution of Plants.

The number of plants distributed amounted to 300 in transplant boxes and 1656 pot-grown, as follows:

	Transplant boxes	Pot- Grown	Total
Sold . . . . .	150	142	292
Gratis . . . . .	150	1514	1664
Total.....	300	1656	1956

## COLLECTIONS.

## Government Realizations.

Collections in account of plants sold.....	\$ 5.15
Rent of Building, Nursery Grounds for August.....	35.00
Total.....	<u>\$40.15</u>

## Preservation of Forest Reserves, Etc.

Rent of premises at Halfway House, Tantalus for quarter ending September 30th.....	\$30.00
Fee for use of land and gathering ti leaf Kalawahine, Pauoa Valley, for quarter ending September 30th...	12.50
Rent of small piece of land in Pauoa Valley from April 1st to April 1st (1920-1921).....	3.00

## Black Sand.

94 loads black sand taken from Makiki Valley Sand pit at \$.50 .....	47.00
Total.....	<u>\$92.50</u>

## Animal Industry Revolving Fund.

Princeville Plantation Co.: To 2079 doses Anthrax serum and vaccine at \$.30.....	\$623.70
---	----------

## SEED COLLECTING.

We have on hand a large quantity of seed of both forest and ornamental trees. The African Tulip (*Spathodea campanulata*) is seeding this year for the first time known to the writer.

We were fortunate in receiving from Madagascar about five years ago two pods of this beautiful tree. From the two pods we were able to raise over 2000 plants. Those we distributed to people all over the islands. From the trees planted around Honolulu, we were able this year to collect a large quantity of seed. We have been trying for the past two years or more to procure more seed from Madagascar, but without success, as this tree is in great demand. We can now get all the trees we want from seed collected here.



## PLANTATION COMPANIES, ETC.

Trees distributed during the month amounted to 800 trees in transplant boxes.

## MAIKI STATION.

The work done at this station consisted of the regular routine which includes the transplanting of trees into tins and boxes, sterilizing soil, etc.

## HONOLULU WATERSHED PLANTING.

The principal work done on the watershed during the month consisted of clearing trials, clearing away vines and weeds from the young trees, etc.

## LUALUALEI.

J. K. Luka reports that he planted during the month 930 *Eucalyptus resinifera*, 800 *Cedrela Australis* (Australian Red Celar), 1657 *Eucalyptus crebra*.

## HILO SUB-NURSERY.

Bro. M. Newell, in charge of the nursery for the Island of Hawaii, reports that he distributed during the month 212 trees in transplant boxes.

## HAIKU SUB-NURSERY.

Mr. James Lindsay, in charge of the nursery for the Islands of Maui and Molokai, states that he distributed during the month 32 assorted trees.

## KALAHEO SUB-NURSERY.

Joe Rita, Jr., in charge of the nursery for the Island of Kauai, reports that he distributed 400 trees in seed boxes and 529 in tins—total 929.

## ADVICE AND ASSISTANCE.

The writer has been called upon to make visits and otherwise give advice and assistance as follows:

Visits made .....	6
Advice by telephone.....	5
Advice to people calling.....	8

Respectfully submitted,

DAVID HAUGHS,  
Forest Nurseryman.

## REPORT OF THE ENTOMOLOGIST, SEPTEMBER, 1920.

October 13, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—During the month of September the insectary handled 19,900 pupae of the melon fly from which there were bred 4,727 females and 3,696 males, *Opius fletcheri*.

The distribution of parasites was as follows:

## MELON FLY PARASITE.

*Opius fletcheri*.

	Females.	Males.
Oahu:		
Nuuanu Avenue .....	300	300
Kalakaua Avenue .....	200	200
Moilili . . . . .	1500	1250
Moanalua . . . . .	1000	950

## FRUIT FLY PARASITES.

*Galesus silvestri*.

Oahu:	
Nuuanu Avenue .....	800

*Dirhinus giffardi*.

Oahu:	
Nuuanu Avenue .....	500

*Diachasma fullawayi*.

Maui:		
Hana . . . . .	100	100
Oahu:		
Pupukea . . . . .	100	100

Fourteen queen bees were held in quarantine during the month as follows:

Brother James, St. Louis College.....	12 Italian
F. Santos .....	2 Carniolan caucasian.

As no brood disease had developed at the expiration of the term of quarantine, the surviving queens were delivered to the importers.

Respectfully submitted,

DAVID T. FULLAWAY,  
Entomologist.

## REPORT OF THE CHIEF PLANT INSPECTOR, SEPTEMBER, 1920.

September 30, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—I respectfully submit my report of the work carried on by the Division of Plant Inspection for the month of September, 1920, as follows:

During the month 56 steamers arrived at the Port of Honolulu, 21 of which carried vegetable matter and 2 vessels came through the Canal Zone. The following disposal was made of the various shipments:

Passed as free from pests.....	1620 lots	31,664 pkgs.
Fumigated . . . . .	11 “	11 “
Burned . . . . .	58 “	58 “
Returned . . . . .	1 “	1 “
<hr/>		
Total Inspected.....	1690 lots	31,734 pkgs.

Of these shipments 31,429 packages arrived as freight, 192 packages as baggage and 113 packages as mail.

## RICE AND BEAN SHIPMENTS.

During the month 10,971 bags of rice from Japan, 160 matts of rice from China and 1418 bags of beans from Japan arrived clean.

## PESTS INTERCEPTED.

Approximately 4332 pieces of baggage belonging to immigrants from foreign countries were examined, from which 37 lots of vegetables and 17 lots of fruit were seized and destroyed.

On Sept. 3, three packages of plants found in the baggage of a passenger from the Orient were seized and destroyed. A package of Betel nuts from Manila and 3 packages of beans from Japan in the mail were fumigated precautionary.

On Sept. 5 a case of plants brought in the baggage of a passenger from the Colonies was burned. A package of seeds in the mail from the Forestry Division was fumigated precautionary.

On Sept. 11, two bags and one basket of herbs in the baggage of an immigrant from China were fumigated on account of weevils.

On Sept. 23, a package of vegetable seeds and a package of castor beans in the mail were fumigated, the former on account of weevils, the latter precautionary.

On Sept. 28 a dwarf pine tree was returned on board the Noma from the Orient, being prohibited. A package of Cocoa beans in the mail on the Ecuador was fumigated precautionary. A lot of puffed rice used as packing in the baggage of a passenger was found infested with weevils and fumigated.

## HILO INSPECTION.

Brother M. Newell, Inspector at Hilo, reports the arrival of 5 steamers at the Port of Hilo. Three carried vegetable matter consisting of 141 lots and 3010 parcels, all clean.

## KAHULUI INSPECTION.

Mr. Louis Gillin, Inspector at Kahului, reports the arrival of 9 ves-

sels at the Port of Kahului. Two carried vegetable matter consisting of 16 lots and 1737 parcels, all clean.

#### INTER-ISLAND INSPECTION.

Fifty-four steamers plying between Honolulu and the other island ports were attended and the following shipments passed:

Taro . . . . .	610 bags
Vegetables . . . . .	277 cases
Fruit . . . . .	253 packages
Plants . . . . .	109 "
Pine Shoots . . . . .	4685 bags
Sugar Cane . . . . .	56 cases
Seeds . . . . .	12 packages

Total Passed..... 6002 packages

Seventy-four packages of plants (which include Spanish Moss) were refused shipment on account of infestation, undesirable soil and not complying with the regulations.

Respectfully submitted,

E. M. EHRHORN,  
Chief Plant Inspector.

#### REPORT OF THE TERRITORIAL VEGETERINARIAN, JULY AND AUGUST, 1920.

September 25th, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—I beg to submit herewith my report on the work of the Division of Animal Industry for the months of July and August, 1920:

#### QUARANTINE OF DOGS.

The importation of dogs from the mainland of the United States and from foreign countries has of late assumed proportions which the regulations now in force do not seem adequately to cover. Reference is especially made to the number of chow dog pups which are being unloaded here by petty officers of the Oriental liners who make it a business to purchase these pups in Oriental ports and to dispose of them either here or in San Francisco and other ports, as opportunity offers. These dogs, or pups, are almost invariably infested with external and internal parasites, lice, fleas and ringworm externally, roundworms and tapeworms internally. Frequently they bring with them the infection of that most fatal of all dog diseases—dog distemper. When a case of dog distemper develops in the quarantine station, it becomes necessary to immediately vaccinate all dogs less than one year old, and frequently older dogs which have not acquired immunity through a previous attack. Such treatment costs, when administered by officers of this Board, from \$1.00 to \$2.00, and, if by practising veterinarians, about \$7.50 or more. Worm treatment and especially tape worm treatment these Oriental pups are, as a rule, not able to stand, many of them, while passing yards of tapeworms, becoming so weak that their vitality gives out and they die. When to this is added that all such pups upon arrival are



infested with fleas and that their tender skin and dense woolly coat of hair make it risky to apply disinfectants or insecticides which will kill the parasites without injury to the host, it will readily be seen that, in order to avoid the continued complaints of the owner of such dogs, and, on the other hand, to protect the bona fide importers of dogs held in quarantine, it will be necessary to amend the present dog importation regulations so as to insure that only healthy dogs are admitted to the Territory—or to quarantine—or at least dogs which may be reasonably counted on to possess sufficient stamina for acclimatization during the period of confinement. To meet this requirement, it is recommended that all dogs coming from foreign countries, and which are intended to remain here, shall be accompanied by a certificate of health issued or approved by the proper live stock official of the country of origin, or at the port of embarkation, showing that such dogs have been vaccinated against distemper and have been submitted to an approved course of worm treatment and disinfecting baths, immediately before shipment. The same shall apply to pups and young dogs coming from the United States and Canada, unless they are the bona fide property of temporary visitors or tourists.

In case of arrival of such dogs without such certificate of health, the owner shall, when so required, provide competent veterinary attendance for the period necessary for the destruction or removal of internal and external parasites and for the treatment of any case of distemper which might develop before vaccination has been applied and become effective. Vaccination for distemper requires three hypodermic injections at intervals of two to five days and frequently is accompanied by severe malaise. The treatment for intestinal worms also may require repeated treatments and cannot be undertaken simultaneously with vaccination, on account of its debilitating effect. If badly infested with fleas, lice or ticks a single bath does not suffice and should, especially in the case of young dogs or pups, always be undertaken with care. When to this is added vaccination for rabies, which requires six inoculations on six consecutive days and which undoubtedly will have to be applied to a majority of all incoming dogs as soon as it has been proven effective and safe, it will be seen that, unless part of these various treatments are undertaken before the dogs arrive here, the vaccination for rabies will have to be postponed for such length of time as these treatments may require, and the length of the quarantine period equally extended.

Under normal circumstances, that is, when dealing with healthy dogs that have either acquired immunity to or been vaccinated against distemper, and that are not infested with parasites or vermin to such an extent as to require immediate treatment, the rabies vaccination may be applied within a few days after arrival and the quarantine period reduced from 120 days to approximately 45 days.

**The Antirabic Treatment or Vaccination** of dogs, which have been exposed to rabies infection, is known as the Hogyes Dilution Method and differs from the Pasteur treatment in that it employs unattenuated but much diluted rabies virus, and requires only six injections as compared to Pasteur's twenty-one to twenty-five injections. The six injections are administered hypodermically on six consecutive days and cause little or no inconvenience to the patient. It has been used during the past few years with signal success on thousands of animals bitten by rabid wolves and dogs in the United States.

Nearly two years ago when our attention was first called to this vaccine efforts were made to obtain it for use here as a substitute for the prolonged quarantine. The material, however, deteriorates very rapidly, that is, it loses its effectiveness in from four to six days unless kept at a very low temperature. As the vaccine, at that time, was made only in New York, from whence shipment to Hawaii would require two to three weeks, the manufacturers advised against using it here,

stating that even on the mainland the six injections, constituting one treatment, are shipped on six consecutive days in order to avoid deterioration in transit. These difficulties have now been overcome. The vaccine we are now experimenting with is made by the Cutter Laboratory of Berkeley, California, and is shipped in thermos bottles placed in the refrigerator of any fast boat immediately before departure from San Francisco. The boat is met upon arrival and the vaccine transferred to the laboratory of this office. As a further precaution, the ground brain substance, or virus proper, and the dilution fluid come in separate containers and are not mixed until immediately before the injection is to be made. Under these conditions the manufacturers assure us that the vaccine will retain its effectiveness for at least two months.

The only drawback to this treatment is that we are dealing with the unattenuated virus of an absolutely fatal disease, and while no cases have been recorded of dogs developing rabies as a result of the vaccination, the manufacturers insist on the vaccinated animals remaining in quarantine for one month after the last injection. We have now at the quarantine station two dogs, one setter and one fox terrier which passed the fifth week after vaccination, and eight other dogs, including four chow pups, which have received all six injections at varying periods of from one to three weeks past. None of these has so far shown any unfavorable results from the treatment. When these eight dogs have passed the requisite period of one month from the last injection, an amendment to the present dog quarantine regulation covering the subjects under consideration will be submitted to the Board.

#### **Importation of High-priced Dairy Cattle from Non-accredited Herds on the Mainland.**

An unusual large number of high class breeding stock has arrived here during the past two months. An importation of Holstein cattle for the Parker Ranch, consisting of five young bulls and twenty heifers is valued at \$40,000.00. One bull calf and one heifer cost \$5,000.00 each. They all came from New England and were selected by Professor W. L. Williams of Cornell University. They were accompanied on the entire trip by Dr. Adrian M. Mills, a graduate of the New York State Veterinary College, Cornell University, who will remain in charge of this new dairy herd.

As these animals did not come from a government accredited herd they had to be retested. Fortunately they all passed the test. Had any of them reacted they would have had to be either slaughtered here or returned to the former owner. In the first case the owner would not be entitled to any compensation, if upon post-mortem examination, lesions of tuberculosis were found to be present. Otherwise the Territory would have had to pay the full appraised value or, in other words, what they had cost landed here.

As the tuberculin test is not infallible, I attended to the retest, which was made on the Parker Ranch, in person. To prove the presence of tuberculosis in cattle which have passed a careful tuberculin test less than two months previously and which have not been exposed to infection during that time is far from easy. The lesions in nearly all cases will be found to be very small and may be located in out of the way places as, for instance, inside a joint. In such a case it may become necessary to cut an otherwise perfectly good carcass to mince meat, whereby additional loss is caused.

We are however confident that the tuberculin test originated here, the intrapalpebral test, is the most reliable of them all, and that when a decided reaction occurs the lesions can be found in 99% of the cases, if not in all.

Another importation arriving in August consisted of 35 high grade

Holstein cows and one registered bull. When retested here three of the cows, valued at about \$300.00 each, gave typical reactions. They were slaughtered and lesions, small but characteristic of the disease, were found in all. The carcasses netted the owner \$260.00. His herd has been free of tuberculosis for a number of years and the effectiveness of our test, as compared to that which had been used on the same animals previous to shipment, saved his herd from reinfection and the Territory from subsequent indemnification disbursements.

A third importation coming from Kentucky consisted of two bulls and four heifers, all registered Holsteins. On retest here one of the bulls, Champion Korndyke Pontiac Segis, gave typical reaction. The original owners declined to have the bull returned, but requested that it be held here for two months and then retested. To this we have agreed with the understanding that the animal will be slaughtered whether it reacts to the retest or not, on the principle that "once a reactor always a reactor."

The swelling of the eyelid resulting from the tuberculin injection was the size of a walnut and constituted what we consider a most decided reaction, and we have no doubt that tuberculous lesions will be found on post-mortem. If not, the Territory must reimburse the owner the full value of the animal, \$500.00 plus shipping expenses. On the other hand, the presence of tuberculosis being proved, the original owner agrees to substitute an equally good animal for the destroyed one without loss to either the Territory or the importer.

#### Proposed Amendment of Act 204, S. L. 1919.

From the above quoted cases, it would appear that to safeguard the Territory against the possibility of having to reimburse an importer of fancy herd toppers or high priced breeding stock, which may have passed a tuberculin test somewhere in the United States, but which come from an infected herd or from a herd which has not been officially proved to be free of tuberculosis, it will be necessary to amend Act 204, S. L. 1919, as follows:

Sec. 4 of this Act reads:

"Indemnification. The amount of indemnification shall be based upon the results of the post-mortem inspection as follows:

"(a) If an animal is found upon post-mortem examination not to be affected with tuberculosis, the owner shall be paid the full appraised value less the salvage of the carcass."

To the above paragraph it is suggested to add:

"The same shall apply to registered cattle imported from the mainland of the United States, coming from herds accredited by the federal Bureau of Animal Industry as being free of tuberculosis, and which have not been exposed to infection in transit. Indemnification for unregistered cattle and cattle coming from unaccredited herds or which have been exposed to infection in transit or within six months after arrival shall, if condemned before admission to the Territory, be limited to the same amounts as in paragraphs (b), (c) and subsequent parts of this section for tuberculous cattle specified."

The aim of this amendment is simply to insure that the importers of cattle should take every precaution possible to guard against the introduction of tuberculosis and to avoid the possible, though remote, contingency of the Territory having to disburse large sums of indemnification for imported cattle which react to the tuberculin test, but which cannot



he proved upon post-mortem examination to be affected with the disease.

### Reports of Deputies.

From Hawaii, Dr. Elliot reports the arrival of a considerable number of registered Hereford and Holstein cattle, principally for the Kapapala Ranch, Pahala and Hutchinson Sugar Plantation. A severe outbreak of gastro-enteritis occurred among some of these cattle while at the quarantine station, due probably to musty hay which arrived with the cattle and which may have been exposed to dampness on board the steamer. Four valuable animals were nearly lost and one mule fed on the same hay died.

Dr. Elliot is gradually rebuilding the Hilo quarantine station, substituting concrete for redwood posts, and installing a new water supply. The prolonged drouth had caused all the tanks to go dry, leaving the station useless for quarantine purposes.

From Kohala, Dr. Rowat reports a case of glanders in a plantation stable where the disease has not been known for years. He requests my assistance with a view to a thorough examination of all horse stock in the Kohala district and the mallein testing of all animals in a number of stables for the purpose of locating a possible "carrier" which he has long suspected the presence of.

Dr. Rowat has resumed tuberculin testing in Kona. With an official district extending over more than one hundred miles—from Kohala to Kau—and side trips off the belt road aggregating an equal distance, on miserable roads, with tires, oil and gasoline advanced from 50 to 100 per cent, Dr. Rowat states he cannot afford to supply his own car at ten cents per mile, the pay hitherto allowed him. The opportunity for private practice in this district is the poorest in the Territory, there being but one sugar plantation between Kohala and Kau. A substantial increase in Dr. Rowat's remuneration for official work is recommended. He supplies his own car, and the withdrawal of his services would embarrass this office and render the tuberculosis eradication act ineffective in a large district.

From Maui, Dr. Fitzgerald reports progress in the control of infectious abortion by means of the vaccines and bacterins supplied by this office. The same applies to a quite extensive outbreak of influenza (infectious catarrhal fever) among the plantation work animals, which are being successfully treated with influenza bacterins.

From Kauai, Dr. Golding reports that swine plague has become endemic in the Lihue district. He has been supplied with the requisite remedies for control of this outbreak.

Very respectfully,

VICTOR A. NORGAARD,  
Territorial Veterinarian.

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REPORT OF THE TERRITORIAL VETERINARIAN, SEPTEMBER,  
1920.

October 13th, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—I beg to submit herewith my report on the work of the Division of Animal Industry for the month of September, 1920:



## IMPORTATIONS OF LIVE STOCK.

During the month of September there arrived at this port 22 dogs of which number 18 have been treated with anti-rabic vaccine.

In reply to an inquiry, addressed to the Cutter Laboratory, Berkeley, California, in regard to the length of time that dogs treated with this vaccine must be kept under observation, the manufacturers stated that they did not consider it advisable to reduce the quarantine period for the animals in question to less than 30 days. This will, however, reduce the quarantine period for the animals to 38 to 40 days and the dogs can be released November 2-5, in case the Board approves the amendment to Rule VIII pertaining to the importation of dogs, copy of which is appended.

The Holstein bull at the Quarantine Station, which reacted to the tuberculin test, as reported last month, will be retested October 14th, and will then be slaughtered, the owners having decided that it would be too expensive to return the animal to Kentucky.

There arrived during the month nearly 100 large animals and it became necessary to engage an assistant for the caretaker of the quarantine station. With more than 30 dogs, besides the other animals, it is impossible for one man to attend to them all properly and an assistant was engaged for the month at the rate of \$65.00. Such expenditure was approved by Mr. Judd for the month of July with the understanding that the assistant should not be permanently employed but only for such periods when an unusual number of animals were at the station. It is, however, recommended in case funds can be provided that the caretaker be furnished an assistant permanently. There is a great deal of work to be done in repairs, painting and cleaning up and I am informed that considerable importations of both cattle and mules may be looked for in the near future.

The caretaker has further been handicapped in his work on account of lack of water. Our pipe line has recently been tapped for the benefit of a neighboring house where they seem to use considerable water. This was done without consulting either the caretaker or myself.

While in Hilo recently I found at the animal quarantine station four 5,000 gallon water tanks the use of which has been discontinued by the installation of city water. I would, therefore, suggest that we have one of these tanks knocked down and shipped to Honolulu, the same to be set up at the quarantine station on a scaffolding sufficiently high to provide pressure for irrigation as well as for keeping the water troughs full. The cost will probably not exceed \$100.00.

Respectfully submitted,

VICTOR A. NORGAARD,  
Territorial Veterinarian.

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REPORT OF THE ASSISTANT TERRITORIAL VETERINARIAN,  
SEPTEMBER, 1920.

October 14, 1920.

Dr. V. A. Norgaard, Chief Bureau of Animal Industry, Honolulu, T. H.

Sir:—I beg to submit the following report for the month of September:

## TUBERCULOSIS CONTROL.

	Tested.	Passed.	Condemned.
M. T. Brazon .....	3	3	0
T. Nakamoto .....	7	7	0
M. P. Moranho.....	3	3	0
H. K. Wilder.....	1	1	0
S. I. Shaw.....	2	2	0
Geo. P. Cooke.....	2	2	0
Wahiawa Dairy .....	4	4	0
M. Freitas .....	4	4	0
M. Salado .....	2	2	0
M. Freitas .....	2	2	0

A total of 30 head were tested during the month, all of which passed the test. Besides the above, several post-mortem examinations were made on previously condemned cattle.

## ANTI-RABIC VACCINE TREATMENT.

During the past month 19 dogs were given the anti-rabic vaccine treatment. All are apparently doing well and will soon be released from quarantine.

## IMPORTATION OF LIVE STOCK.

A total of 54 vessels was met and boarded by the livestock inspector, of which number 10 were found carrying livestock for this port. The following classes of livestock were represented:

Horses, 3; mules, 79; cattle, 18; swine, 3; dogs, 22; cats, 1; goats, 61; poultry, 137 ets.

Respectfully submitted,

LEONARD N. CASE,  
Assistant Territorial Veterinarian.

## THE PROTECTION OF LIVE STOCK IN HAWAII AGAINST INFECTIOUS AND CONTAGIOUS DISEASES (II).

By **VICTOR A. NORGAARD**, Territorial Veterinarian.

*Hemorrhagic septicemia.* Next to anthrax—known to Ptolemies as one of the plagues of Aegypt—is another disease of quite modern antecedents. The old German textbooks refer to it as “Wild-und Rinderseuche,” wild standing for game and Rinderseuche for disease of cattle. It is a disease far more dangerous than anthrax. It was first noticed in these islands on the Parker Ranch in 1909. The writer, being then employed by the federal Bureau of Animal Industry, reported the outbreak, which only covered less than a dozen head of cattle. He was in turn informed that this disease had appeared and been recognized by veterinarians in six of the eastern states. The following year, 1910, it was all over the Middle West. The following year it

was killing the buffalos in the Yellowstone Park. Then Dr. Mohler, now Chief of the Bureau of Animal Industry, went out and made a vaccine. That is what we are using here now.

It converts in short time the healthy organs of an animal into the most hideous conglomerations of diseased tissue. Lungs that were pink and inflatable a day before become green solid masses of tissue interspersed with gelatinous streaks. Guts that were hitherto named for their emptiness (Jejunum) become filled with blood. Organ cavities—chest and abdomen—fill up with gelatinous clots, the lymph-glands that were provided for the protection of the organism, simply throwing up their hands and crying "Help." A disease that makes the veterinarian sit up and take notice. Where would we be if the last legislative assembly had not provided for it? We—the Division of Animal Industry—had on hand between five to six thousand doses of anti-hemorrhagic septicemia vaccine and applied it in the outbreak of this disease in Kau, Hawaii. We had to have new shutes built and the cattle were vaccinated. Only 160 out of 6,000 died, a better record than the anthrax one. What would have happened, had we not had on hand the vaccine, may be guessed at.

We have now on hand between five to six thousand doses of anti-hemorrhagic septicemia vaccine, and unless the disease should break out all over at the same time, we shall be well able to take care of it. *This, however,* is the disease that I, as Territorial Veterinarian, dread more than anthrax or any other disease.

The cost of vaccination for hemorrhagic septicemia is about \$.11 per dose. The curative dose of serum is \$2.50, but it does not always cure.

(To be continued.)

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## ARE THE AGRICULTURISTS OF HAWAII FORTUNATE?

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By **E. M. EHRHORN**, Chief Plant Inspector.

In an article in the "California Cultivator" of May 22, 1920, entitled "Animals Destructive to Agriculture," the author places these animals in two classes—rodents and predatory animals. In the first class are house, meadow and field mice, house and Kangaroo rats, ground squirrels, pocket gophers, jack and brush rabbits. In the predatory class are coyotes, wild cats and mountain lions. The first class, on account of the size of the animals and greater numbers, is nearly a hundred times as destructive to agriculture as the second class. A conservative estimate of the present losses to the farmer amounts to about \$45,000,000.00 divided as follows: \$20,000,000.00 from ground squirrels, \$15.

000,000.00 from pocket gophers, \$5,000,000.00 from rabbits, all others \$5,000,000.00. Losses from predatory animals are hard to estimate, but from the State of Utah a report estimates that 500,000 head of sheep were destroyed in 1915. Owing to a systematic control through hunting, trapping and poisoning, a material decrease was obtained, in 1919, only 75,000 head of sheep being killed.

What bearing, if any, has the above on Hawaii? We have some field mice and field rats, house mice and common rats, but we have no ground squirrels, pocket gophers, jack and brush rabbits, and these are the ones which do the greatest damage to growing crops. Again, as far as predatory animals are concerned, Hawaii is free from them and we can consider ourselves fortunate. At times one hears fellow citizens remark about the folly of trying to keep out pests. "Why, we have got all the bugs there are right here in the Territory." In 1917 the U. S. Dept. of Agriculture published a bulletin entitled "A Manual of Dangerous Insects Likely to be Introduced in the United States Through Importations." In looking over the enormous list of pests cited, let me just touch on a few crops that we are interested in, and their insect enemies.

**SUGAR CANE.** The sugar cane industry here was once threatened by the cane leaf hopper and, had it not been for the finding of parasites to cope with it, no doubt we would be experiencing a terrific loss annually. There are many other species of cane leaf hoppers in other countries. Mr. Muir recently enumerated 21 that he knows of in the Orient, Malay Archipelago, Philippines and others in Africa not yet named. There are a lot of other pests such as leaf miners, stem borers, root borers, defoliating moths, aphids or plant lice and scale insects in many parts of the world especially on the Islands of the Pacific Ocean. Also, there are many diseases of cane known to exist in the Orient, Malay Archipelago, Queensland, Fiji and other countries which could easily be brought here in soil or other materials if it were not for our strict quarantine rules and regulations.

**PINEAPPLES.** Within the last ten years the pineapple industry has grown from a very small industry to enormous proportions. Practically speaking, there are no serious pests here to hamper this industry, yet the records show that many very injurious pests exist in other countries. In the West Indies, for instance, they have a borer which works into the root of the plant and tunnels up into the stem and into the growing fruit, causing enormous losses to the crop. In Fiji, only a ten day trip from Honolulu, they have a fruit fly which attacks pineapples. In the Philippines they have a blight which kills off hundreds of acres annually.

**RICE.** One of the main foodstuffs of the Oriental race is rice and, although the industry here is not what it should be, it is, practically speaking, free from serious pests. Two rice stem



borers from India are known here. Of leaf hoppers and true bugs, there are 17 species recorded from Formosa, India, China, Japan and the Philippines. There are 3 root borers of the rice plant recorded from India and Formosa, also a number of leaf-eating beetles and moths from India, Japan, China and Java. If any or all should ever gain a foothold here, it would go hard with our rice growing industry.

**SWEET POTATOES.** The few pests which gained admission to these Islands as attacking sweet potatoes came here before the Horticultural Quarantine was started. This, we know, for we still find these same pests at times in the shipments arriving to-day. Fortunately only a few came, as the records show that there is another borer in Liberia, some leaf hopper in Java and India and other pests in various countries of the Pacific.

**BANANAS.** We have only 2 or 3 minor pests attacking our banana industry. About eleven pests are reported from other countries among which is a very destructive borer. This species has been intercepted on several occasions. In Fiji there is the banana fruit fly which does much damage to the fruit, also a species in New Hebrides, Queensland and New South Wales which does similar damage. In Central America a disease known as the "banana blight" has killed off thousands of acres in one year. Fortunately our rules and regulations prohibit the importation of banana plants and fruit, so that only through accidental introduction can these pests become established.

**CITRUS FRUITS** (oranges, lemons, limes, etc.) We have a few pests which damage our citrus fruits especially the Mediterranean fruit fly. However, the records show that no less than six other fruit flies exist in the Orient, India, Fiji, Mexico, Central and South America and the West Indies.

**COCOANUT PALM.** Our cocoanut palm and fruit is, on the whole, free from serious pests—pests which would threaten the life of the plant. We have a leaf roller which does considerable damage in favorable seasons. We also have a few scale insects infesting the plant but there are many more serious pests in foreign countries which not only damage the palms but kill them outright. In the Philippines and Cuba a disease often kills off the groves, just as if a fire had swept through them. In Samoa the two cocoanut beetles (these are as large as your thumb) do a great deal of damage to the palms, often killing acres in one season. These pests are so serious that the governments of the different islands prohibit the transportation of cocoanuts from one island to another. Fiji has many serious pests of the cocoanut palm. Several large palm weevils exist on the Islands of the Pacific and in the West Indies.

One could go on thus almost indefinitely, but let us be assured that although Hawaii's agriculture has its insect and fungus enemies, we are exceedingly fortunate in not having more of those on the outside which are also, according to the record be-

fore us, more injurious than those we now have. Eternal vigilance and the strict enforcement of plant quarantine regulations are the price to be paid for immunity from these pests of other countries.

## TERMITES, OR WHITE ANTS, IN HAWAII.

By **DAVID T. FULLAWAY**, Entomologist.

### INTRODUCTION.

The damage done by termites, or white ants, to wood, wood-work and wood products has increased noticeably in the past few years in the city of Honolulu, and the resulting losses have been the occasion of considerable anxiety in certain quarters.

These insects have been familiar to residents of the islands in the past by their invasion of dwellings, where occasionally their destructive activities in furniture and wood work would make itself apparent. The earliest investigations of the fauna of the islands<sup>1</sup> revealed the widespread presence of two species, referred respectively to *Kaloterms marginipennis* and (*Neoterms*) *Kaloterms castaneus*, the latter, however, being a true forest insect and confining itself entirely to the decaying wood of trees.

The previous destruction wrought by these species is slight compared with that being done at the present time. The change which has occurred in this respect is to be accounted for by the entrance at Honolulu of two vastly more destructive species, namely *Coptotermes intrudens*, which was first noticed in 1913,<sup>2</sup> and a species *Cryptotermes*, referred to *C. brevis*, which has probably been here since 1904. These species are spreading rapidly, but at present are confined principally to Honolulu.

The serious nature of these insects becomes apparent on considering the large use made of wood in construction throughout the islands, and the difficulty experienced in combatting them or in attempting to restrain their spread. It has therefore been necessary to give some attention to their study, which has been very much neglected. Their cryptic habits, however, render them difficult objects in this regard, and the investigations being made of their biology cannot soon be completed. In view, however, of the importance of the subject, the need of attracting attention to them and of educating the public in regard to the means of circumventing or destroying them, it is considered advisable to publish the following general account at once. The results of the investigations will be made known at convenient times later.

<sup>1</sup> Am. Nat. Hist. (5) XII, 1883, p. 227; F. H. II (2), p. 88.

<sup>2</sup> Proc. H. E. S. III (1), p. 27; Intr. to F. H., p. clxiv.

NATURE OF THE TERMITE<sup>3</sup>

The term "white ant," commonly used for the insects under discussion, probably has such vogue that it cannot be replaced now, but since it associates these insects with the ordinary ant, and one is led to suppose that they differ chiefly in their color, it is confusing and should give way to the more distinctive name "termite." Beyond the circumstance that they are both social insects and that a somewhat imperfect analogy can be drawn between their different forms and habits, termites have no resemblance to the ordinary ants and their affinities, based on structure, are with quite different insects. The term "borer," applied to them, is likewise insufficiently discriminating, although accurately descriptive of some of the species, particularly those which have been here the longest and with which older residents are familiar.

Termites, though highly specialized like the ants, are on the other hand insects of relatively low organization and are believed to be derived from the ancestors of the *Blattidae* or cockroaches, which is evident from the structure of the wings of the most primitive form. On account of their specialization, however, they are now held to constitute a distinct order of insects, to which the name Isoptera is applied. More than 800 species have been described. They are world-wide in distribution, but the tropics contain the richest representation. They have thirteen distinct body segments in addition to the head. The body is terminated by a pair of short cerci, and in the male (and sometimes in the female also) there is a pair of stylets near the middle of the hind edge of the 9th ventral segment. The integument is delicate and the chitinous plates are never very hard. Frequently they are so slightly developed that the creature appears to consist of a single membranous sac with creases in it, the head alone being very distinct. The antennae are short, moniliform, multisegmented. The wings of termites are not like those of any other insects. The four wings are in repose laid flat on the back, so that the upper one only is seen except at the base. They are membranous and very elongate, extending far beyond the apex of the abdomen. The hind pair is closely similar in size, form and consistence to the front pair. The neuuration is very simple. The most remarkable feature of the wing, however, is its division into two parts by a suture or line of weakness, along which it can be broken off, the stumps in that case remaining as short, hairy flaps reposing on the back.

Termites live socially in large or small colonies, and exist in two or three castes, usually a soldier caste (with modified head), a worker caste (absent in *Kaloterme*s), and the winged caste, which is always present. The winged caste consists of the male and

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<sup>3</sup> This general account of the Termites is adapted from Cambridge Natural History (Insects) by David Sharp, chap. XVI. Termites.



female adult insects, which have functional, faceted eyes and a pair of ocelli or simple eyes. The wingless individuals are very numerous and are more or less blind, at least the soldiers are generally without eyes.

The colony is started by the winged males and females, which, after the swarm flight referred to later, drop their wings and seek a suitable place for a nest. These are known as colonizing forms.

After some time the female becomes enlarged with eggs, often to a very great extent, when she is known as the queen or true queen, or queen mother. In some species the true queen is rare, or at least difficult to find. Sometimes nymphal forms become fertile and serve as complementary or substitute queens. They are referred to as "neotines." The soldier is usually more or less characteristic for each species. The initial growth of the colony is slow. Only a few eggs are laid in the beginning, which hatch after a period of incubation. The young are at first undifferentiated larvae. These give rise to the different forms already referred to, soldier larvae and soldiers, worker larvae and workers (where present), and nymphs and adult winged males and females or neotinic forms. The metamorphosis is slight and gradual and in some individuals is dispensed with. It would appear that fully a year elapses between the hatching of the egg and the development of the winged insect, although the soldier may complete its development in less than a year. It is probable that the queens endure several years. As a result of termite economy, large numbers of superfluous individuals are frequently produced in a nest. These in the winged state leave the community, forming swarms which are often of enormous extent. They are eagerly preyed on and most of the individuals destroyed, but the small proportion which escape begin the establishment of new colonies, as already related.

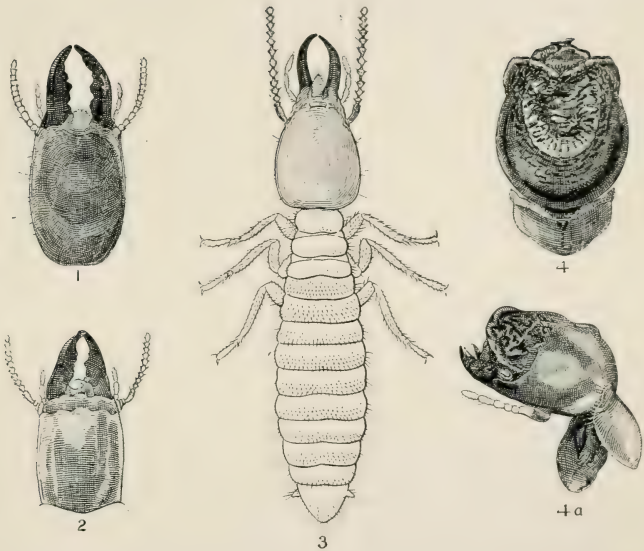
#### SPECIES OF TERMITES FOUND IN HAWAII, THEIR RELATIONSHIP AND HISTORY.

As stated above, there are now found in Hawaii four species of termites generically distinct and belonging to two separate families and sub-families, according to the following tabulation:

Fam.	{	<i>Kaloterms</i> referred to <i>marginipennis</i> Latreille	
<i>Kalotermitidae</i>		<i>Neoterms</i>	" <i>castaneus</i> Burmeister
Sub-fam.		<i>Cryptoterms</i>	" <i>brevis</i> Walker.
<i>Kalotermitinae</i>			
Fam.	{	<i>Coptotermes intrudens</i> Oshima	
<i>Termitidae</i>			
Sub-fam.			
<i>Coptotermitinae</i>			

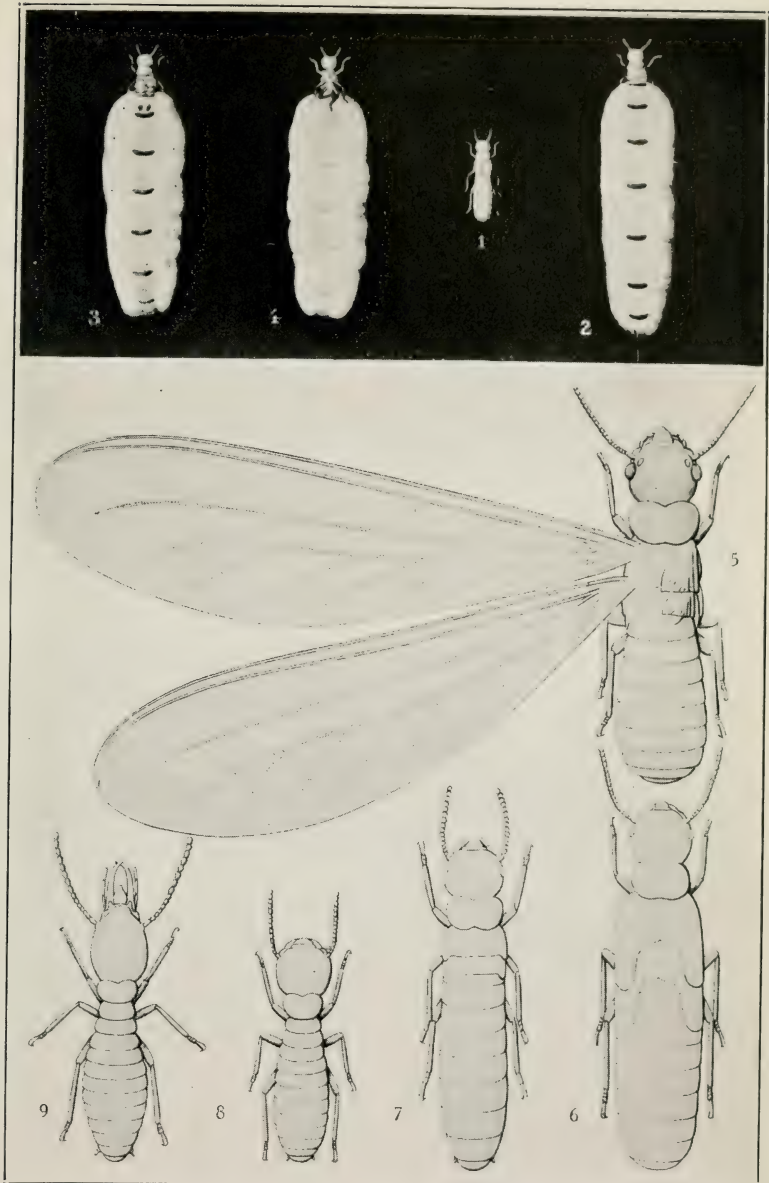


PLATE I.



- Fig. 1. *Neotermes* sp. referred to *castaneus* Burm., head of soldier  $\times 5$ .  
 “ 2. *Kalotermes* sp. referred to *marginipennis* Latr., head of soldier  
 $\times 5$ .  
 “ 3. *Coptotermes intrudens* Oshima, soldier  $\times 9$ .  
 “ 4. *Cryptotermes* sp. referred to *brevis* Walker, head of soldier,  
 top,  $\times 11$ .  
 “ 4a. *Cryptotermes* sp. referred to *brevis* Walker, head of soldier,  
 side,  $\times 10$ .





**Coptotermes formosanus** Shiraki, a destructive Formosan species closely allied to **Coptotermes intrudens** Oshima.

- |                                  |   |
|----------------------------------|---|
| 1. King $\times 2$ .             | 6. Nymph of winged form $\times 10$ .           |
| 2. Queen $\times 2$ .            | 7. Nymph of substitute royal form $\times 10$ . |
| 3. Queen $\times 2$ .            | 8. Worker $\times 10$ .                         |
| 4. Queen under side $\times 2$ . | 9. Soldier $\times 10$ .                        |
| 5. Winged form $\times 10$ .     |   |

(Copied from Yano, White Ants in Japan.)





On the authority of Dr. T. E. Snyder,<sup>4</sup> of the U. S. Bureau of Entomology, who has examined specimens of termites from Hawaii and compared them with authentic material, the three *Kalotermit*es have been erroneously referred to the species named and are distinct from any species previously described. They will therefore soon be described as new.

The species of *Coptotermes* was recently described<sup>5</sup> by Mr. Masamitsu Oshima, of the Institute of Science, Government of Formosa, from specimens taken by the writer. It is said to be very closely related to *Coptotermes formosanus*, the destructive Formosan species, and is probably Asiatic in origin, although the genus is represented in Australia, South America and Madagascar. As previously stated it was first noticed in Honolulu in 1913. In the meantime, it has slowly spread and occupied new ground, but has not gone generally beyond the limits of the city as far as I know. I believe the infestation of sugar cane discovered at Pearl City is the only instance of its occurrence outside.

The species of *Cryptotermes* found here, although the winged forms were collected as early as 1904, was not distinguished from *Kalotermites marginipennis* until 1917 when soldiers were discovered, compelling immediate discrimination. The head of the *Cryptotermes* soldier is large and thick and has a deep cavity in the front—a very distinct type.

#### HABITS OF HAWAIIAN TERMITES.

A striking difference is found in the habits of the species distinguished above in respect to their family relationship, and as the three species included in the *Kalotermitinae* are essentially similar in habit, it is only necessary to discuss the habits of one, the species of *Cryptotermes*, which will serve as a type of that group in the same way that the species of *Coptotermes* serves as a type of the *Coptotermitinae*.

Habits of *Cryptotermes*—typical of *Kalotermitinae*. The species of *Cryptotermes* and its congeners are essentially borers. Unlike other termites, they are able to live in dry wood, to which they gain access by boring an entrance hole. Once inside, their galleries are extended lengthwise with the grain of the wood and widened in places. Here is formed the simple nidus. Around the royal pair are the larvae, nymphs and soldiers, and adhering to the walls usually a few eggs. There is no worker caste in this group. Colonies usually consist of less than a hundred individuals but are generally closely spaced and numerous. Often lateral, communication channels are formed,

<sup>4</sup> Snyder in litt.

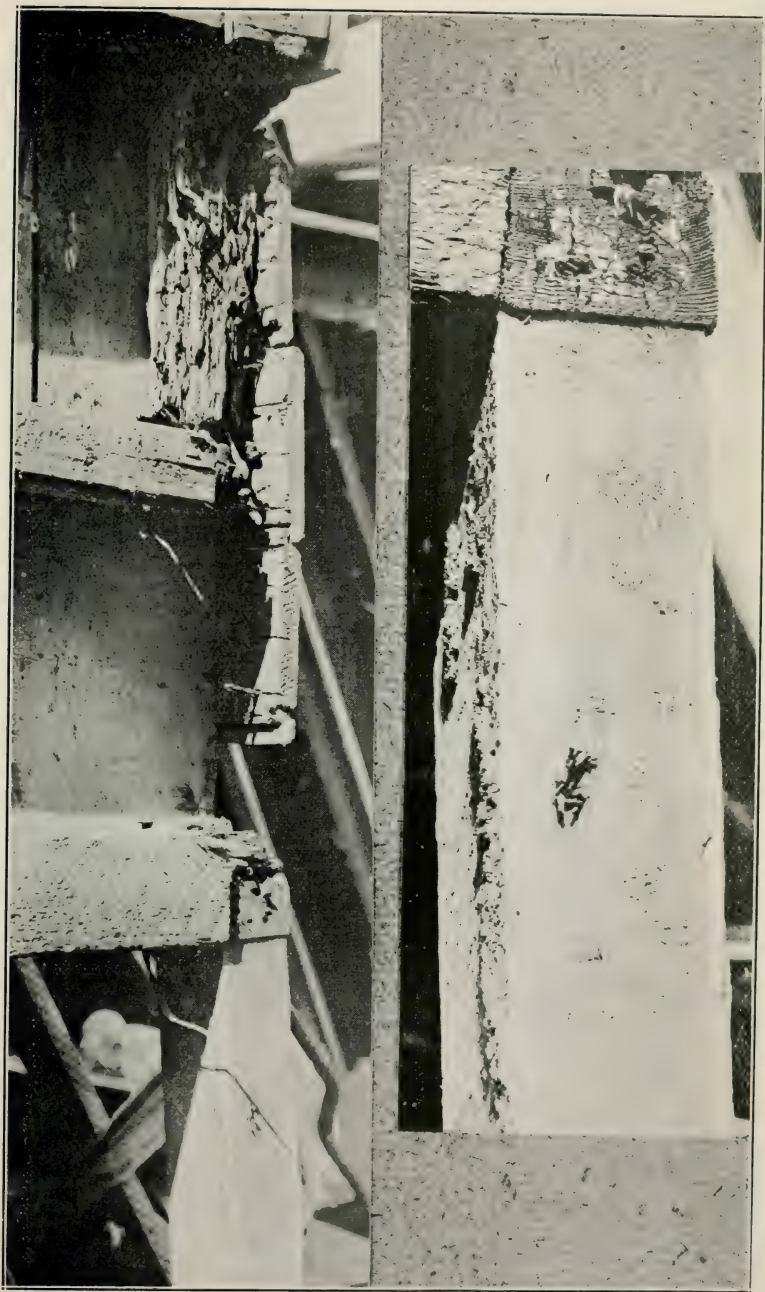
<sup>5</sup> Proc. H. E. S. IV (2), p. 261.

which are usually of small diameter, and these as well as the entrance hole are often stopped with a parchment-like curtain. At a later period in the life of the colony the queen becomes enlarged by the distention of the abdomen with eggs and fat body and then the hard chitinous sclerites appear as narrow transverse plates on the dorsal and ventral surface of the white, soft, unchitinized integument. At seasonal periods, usually in the winter months, large numbers of nymphs are produced, and with the first warm spring weather, usually in May, these transform to adult winged individuals and swarm. The swarm usually occurs from dusk on into the night. Lighter swarming or individual emergence continues on through the summer. Occasionally a flying individual will be observed in mid-winter. Flights often occur after a rain. As previously related, the individuals engaged in the swarm are colonizing forms, adult males and females, which eventually cast their wings and settle down to the establishment of a new nest.

Habits of *Coptotermes intrudens*—typical of *Coptotermitinae*. The colonies of this species, while beginning as far as it is known in the usual way, ultimately become very large, the individuals numbering many thousands. Soldiers are very numerous and are peculiar in the possession of long sickle-shaped mandibles and a frontal gland, from which a white, acrid fluid is expelled when the insect is molested. The queen has never been observed.

Unlike the species of *Kalotermitinae* referred to, this species cannot endure in dry wood. It appears to be very sensitive in respect to moisture conditions and a dry atmosphere if long continued is eventually fatal to it. It constructs its nests therefore in or near the ground, and as wood is consumed it is replaced by a mixture of earth, abdominal excreta and saliva. If forced to build the nest above ground soil is carried up into it and maintains the proper degree of humidity by absorption of moisture from the atmosphere. This species swarms at night in the spring of the year. An idea can then be gained of the vast numbers in their crowded nests, for they are on the wing about electric arc lights literally in clouds. Few of these individuals survive, however, as they are easy prey for ants. Those which do survive can usually be found later under fragments of wood where they attempt to start new colonies. A few eggs are laid in a hollow depression in the ground from which a beginning is made. Apparently eggs at first are not deposited continuously from day to day, but the initial lot hatch before a new batch is laid. The colony is built up very slowly but later when the egg laying capacity of the queen is developed to its full extent multiplication is effected rapidly, and the destructive capacity of the species is readily realized. The nests observed have not been of extraordinary size, never more than five cubic feet, I believe. The necessities of the growing colony in the way of fresh wood

PLATE III.

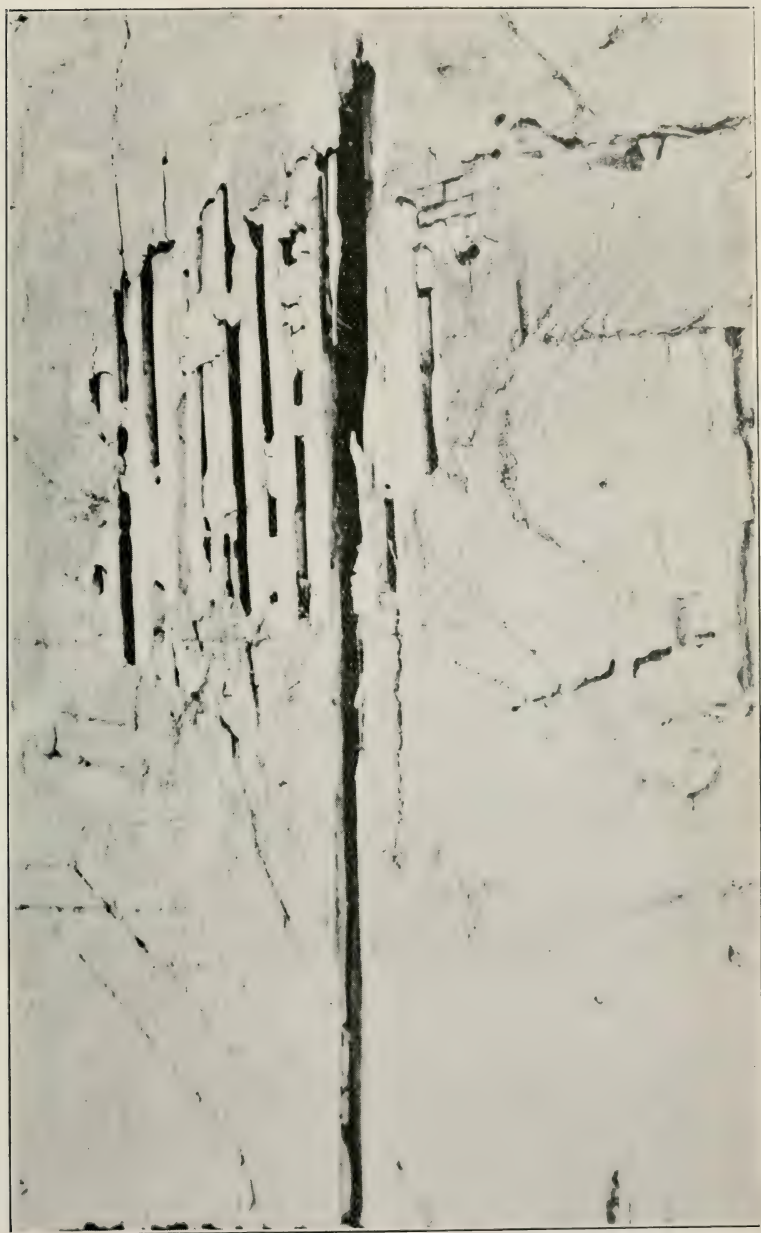


Work of *Coptotermes intrudens* Oshima. Runway constructed on supporting timber and leading from underground nest to framework of dwelling-house in Honolulu. (Reduced.)





PLATE IV.



Work of *Coptotermes intrudens*. Supporting timber of a large tenement in Honolulu, so badly damaged by termites that the structure collapsed during severe wind storm in December, 1918. (Reduced.)



are often met by the use of runways through the earth to new sources of supply. Long distances are often traversed in this way. Where circumstances force these foragers to the surface the runway is covered over with material like that used in constructing the nest.

#### DAMAGE DONE BY TERMITES.

Termites are notorious principally on account of their destruction of wood, but they are also known to damage paper and cloth. Recent experiments<sup>6</sup> have definitely shown that they subsist entirely upon cellulose, which explains the peculiarities in their selection of food. Instances are recorded of their penetration of the hardest substances to obtain food and it is claimed that the milky, acid fluid secreted from the frontal gland by the soldiers of species of *Coptotermes* will dissolve lime mortar and lime concrete and enables them to work a passage through these materials.

The multiplication of species in the case of the termites and their restriction to definite environments, due as in the ants to a great measure of adaptability, has determined in a way the character of termite injury as far as Hawaiian species are concerned. For instance, the *Neotermes* is restricted to the forests and so far as known attacks only weakened or dying trees, the *Coptotermes* flourishes in moist situations, generally attacking wood in or near the ground. *Kalotermes* and *Cryptotermes* on the other hand cannot endure a great deal of moisture but can thrive on dry wood. They favor the woodwork and interior furnishings of houses.

The damage done by termites in Hawaii which has come to the writer's attention includes a wide range of subjects, as follows:

Frame buildings, railroad ties, construction timbers, wood furniture, service poles, stored lumber, books, wharf timbers, shooks, packing boxes, trees, shrubs, cotton cloth, crop plants.

#### METHODS OF CONTROL.

Natural or biological control. There is very little prospect of securing a practical and effective control of the termites present in Hawaii by natural agencies. At present we know of no internal parasites of these insects with the exception of certain protozoa which are found always and everywhere in association with termites, but are apparently not inimical, and are possibly beneficial. In this respect the termites resemble another very successful group of insects, the mosquitoes. Termites are also subject to the attack of mites and molds, or parasitic fungi. The latter are known occasionally to wipe out colonies entirely but neither can be said to exercise an effective control over ter-

mite activity. In the tropics where termite life reaches its highest expression some animals habitually depend upon termites for their sustenance and are peculiarly adapted to this means of livelihood. Birds like the swifts also find a ready and abundant supply of food in the great swarms of colonizing individuals emerging as a seasonal occurrence from the large nests which many tropical species form. But these agencies by which nature exerts a check on excessive multiplication of termites appear impractical for our purposes. In discussing the enemies of termites we must not overlook the ants, which are most persistent foes of termites and in the case of the aggressive carnivorous species make havoc in any termite nest to which they can gain access. They undoubtedly exercise a great check on the termites here particularly upon colonization but the vast numbers in which termites exist and the abundant supply of food together with the self-containment of their nests give a great advantage to the termites in the struggle for life.

Artificial control. Two courses are open to pursuit in attempting a control by artificial means, viz.: (1) The reduction of the termites by the destruction of their nests or termitaria. (2) Reduction of the termites by depriving them of their sustenance. The latter naturally would be an anticipatory or preventive measure as far as damage is concerned.

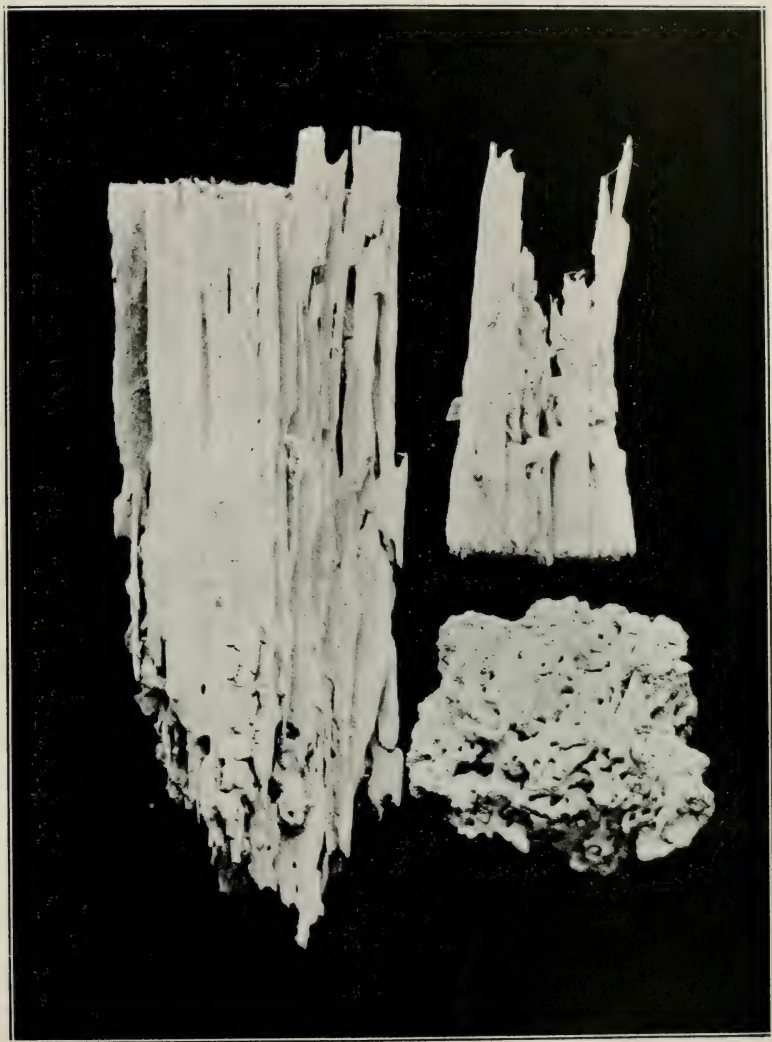
1. Destruction of nests or termitaria. Probably the best method of accomplishing this purpose is by fumigation with carbon bisulphide, hydrocyanic acid gas or the fumes derived from the burning of arsenic and sulphur. The location of the nest would be an important consideration in fumigation particularly as the gases require concentration to be effective. It is not believed that fumigation can be applied to the treatment of houses where the nests (of *Kaloterme*s and *Cryptoterme*s) are in the walls or supports, but articles of furniture can be effectively treated in a fumigatorium. If the house is attacked by *Coptoterme*s the nest should be sought for treatment.

2. Anticipatory or preventive methods. These imply the suitability of termite-proof materials and the possibility of rendering materials termite-proof by treatment. The most recent and thorough investigations in this direction were made by Oshima in Formosa.<sup>6</sup> His conclusion is that nothing except iron and stone is absolutely safe from the attacks of termites. He recommends the general substitution of concrete for wood and gives elaborate plans for the construction of termite-proof buildings. Numerous experiments were made to determine the degree to which different woods are termite-proof and the basis of their immunity. Only two woods were found to be entirely resistant, namely, the Australian cypress pine, *Callitris glauca*, and the Indian teak, *Tectona grandis*. Some Philippine woods

<sup>6</sup> Oshima Phil. Jn. Sci. XV (4), 1919.

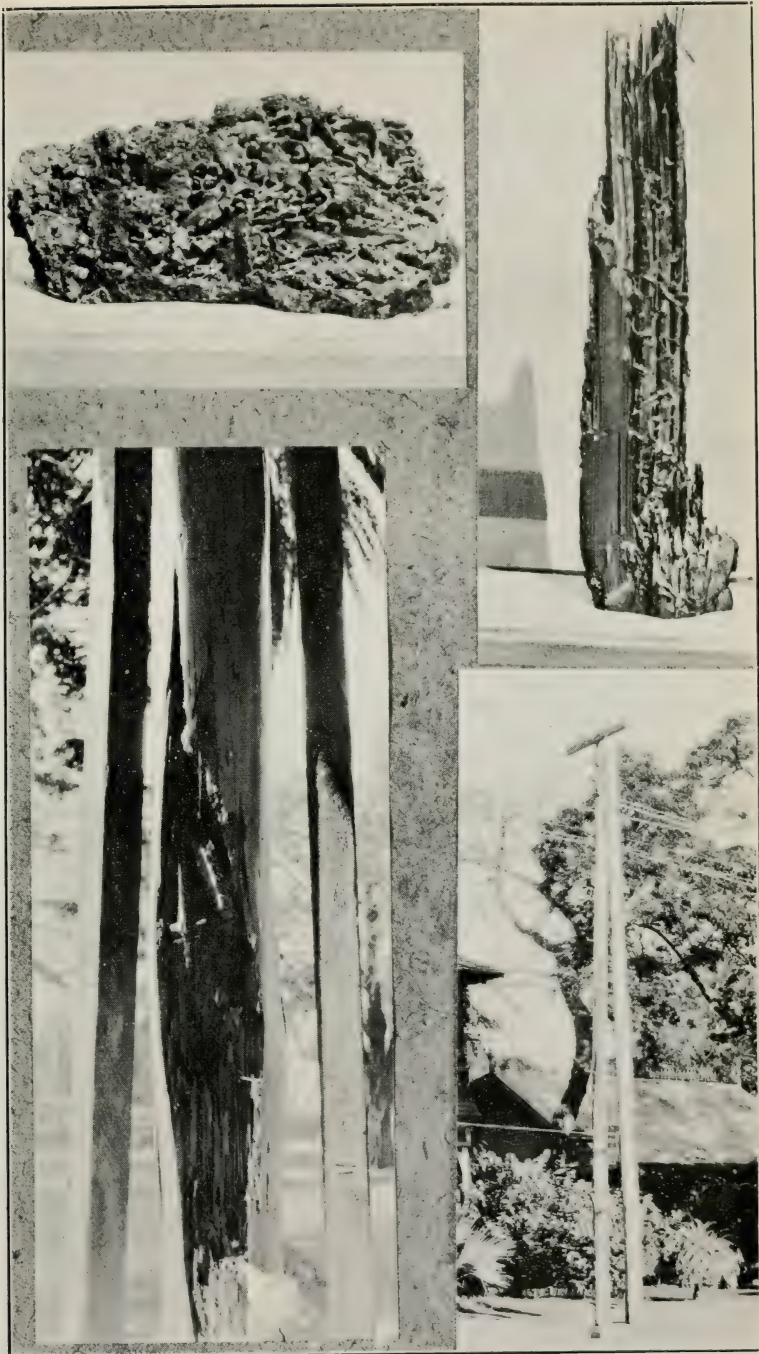


PLATE V.



Work of *Coptotermes intrudens* Oshima. Interior of damaged timbers exhibiting the replacement of cellulose by a composite of earth, abdominal excreta and saliva, with scarcely any tensile strength. (Reduced.)





Work of *Coptotermes intrudens* Oshima. Upper left—Interior of damaged timber described in legend to Pl. IV. Upper right—Section of damaged timber showing hollow core. Lower left—Supporting column in former Capitol bandstand destroyed by termites. Lower right—Telephone pole damaged by termites. (Reduced.)



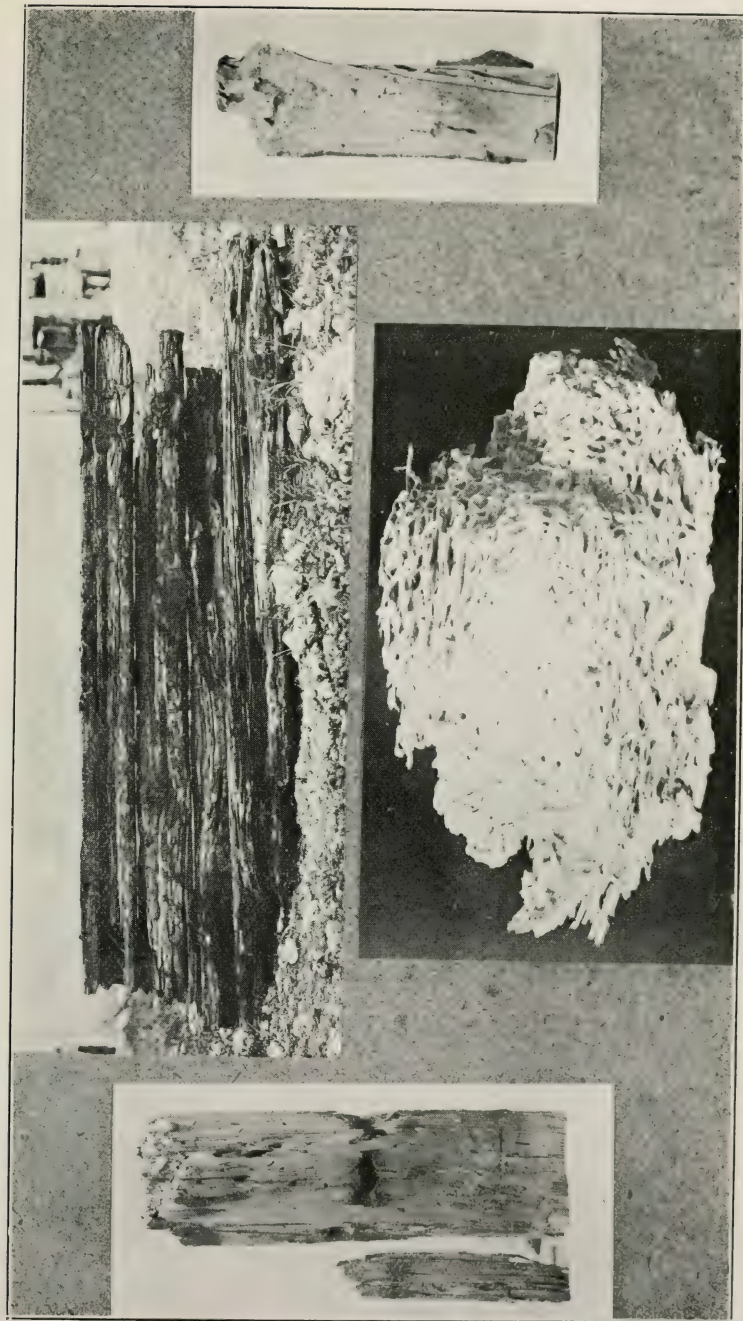


PLATE VII.



Work of *Cryptotermes intrudens* Oshima. Base of electric power pole destroyed by termites.





Work of the three lowland species of termites in Hawaii. Center—*Coptotermes intrudens* Oshima, damaged railroad sleepers above, interior of damaged timber below. Left—*Kaloterms* sp. referred to *marginipennis*—damaged timber. Right—*Cryptotermes* sp. referred to *brevis*—damaged wood sample. (Reduced.)





PIATE IX.



Fig. 1. Work of *Kalotermitinae*. Damaged timbers in former county jail, Honolulu.



Fig. 2. Work of *Kalotermitinae*. Damaged woodwork of dwelling-house in Kakaako.



PLATE X.



Fig. 1. Work of *Kalotermitinae*. Damaged supports of dwelling-house in Kakaako.





like ipil, *Intsia bijuga*, and molave, *Vitex parviflora*, showed a marked degree of resistance. The resistance was found to be due, not to hardness of the wood, but to *sesquiterpene*, an organic compound contained in the wood and readily extracted with benzine or alcohol. Camphor green oil was found to contain 25% of this alcohol and to be entirely satisfactory for the treatment of wood against termite attack. The anthracene oil fractionated from coal tar was also found to be a preventative. Where termite proof construction cannot be followed the thorough creosoting of footings and joints and the liberal use of paint on walls and roof undoubtedly afford a certain degree of protection against termite invasion. In some localities where termites are especially destructive baits with which arsenic is combined are always placed on the ground lot before a building is raised, to ward off termite attack.

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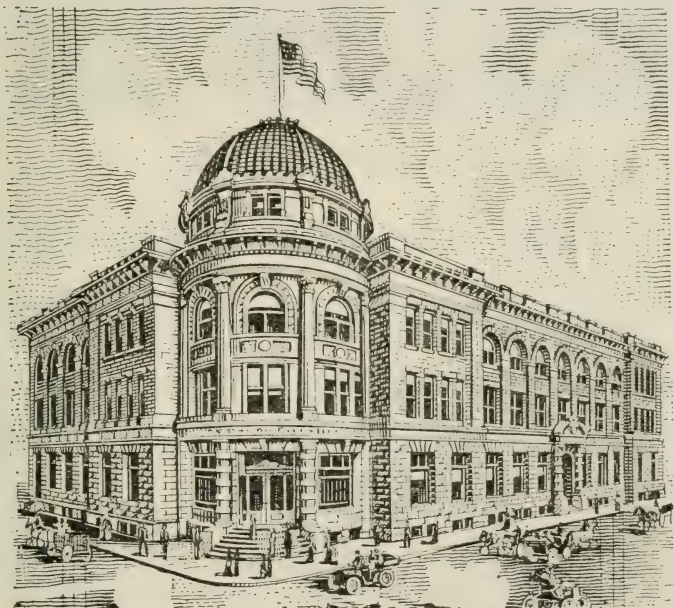
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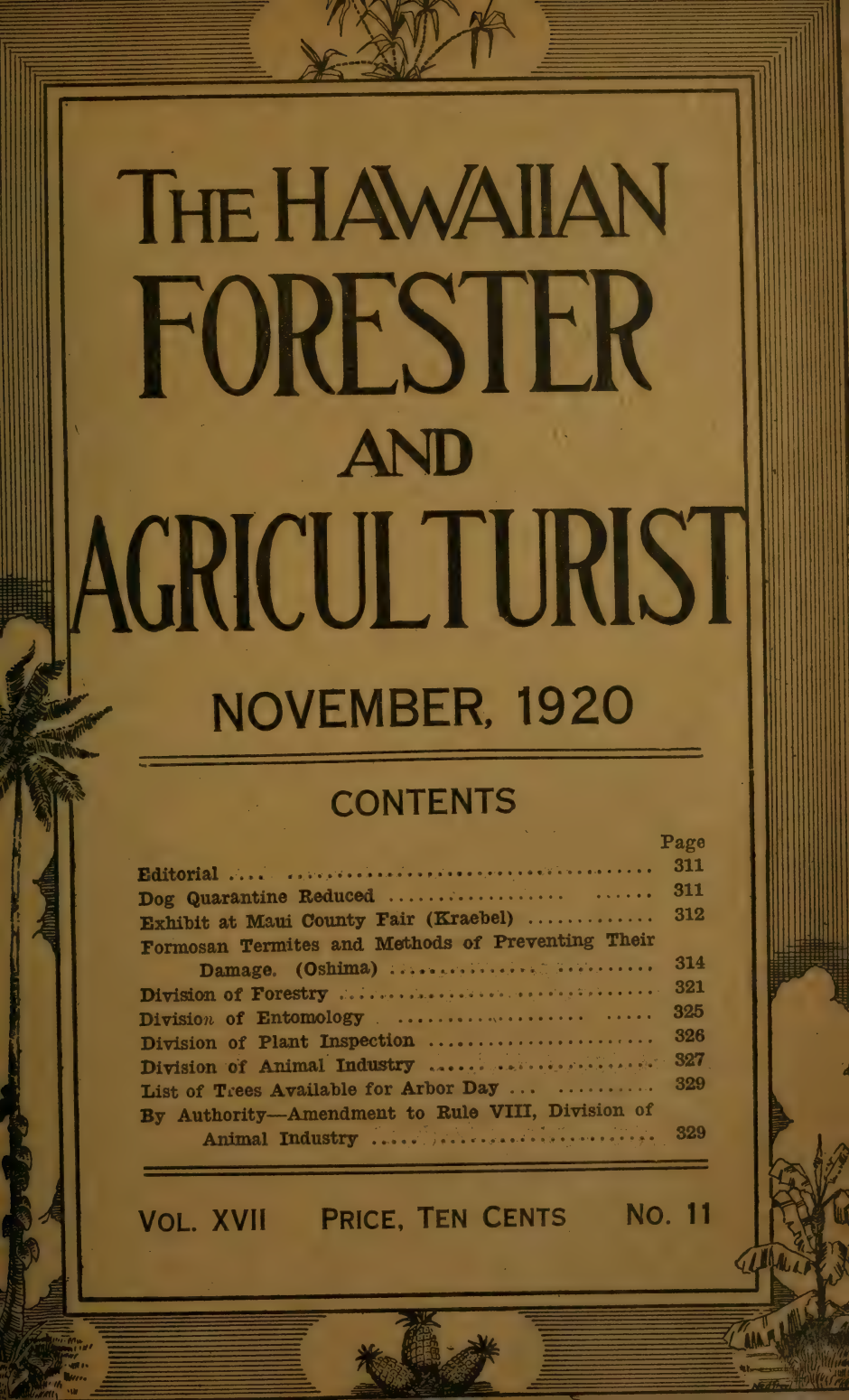
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# THE HAWAIIAN FORESTER AND AGRICULTURIST

NOVEMBER, 1920

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and Agriculture

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# Board of Agriculture and Forestry

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The Division of Forestry maintains the following nurseries on the several islands from which seedlings of the common forest and ornamental trees may be obtained at cost:

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Trees for planting on Windward Kauai may be obtained from the Kapaa School by applying to Mr. Geo. S. Raymond, Principal.

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C. S. JUDD,  
Superintendent of Forestry.

## DIVISION OF ENTOMOLOGY.

To give information about insects free of charge is one of the duties of this Division, and Hawaiian readers are hereby invited to make inquiry in person and by mail. In order to be able to advise intelligently or send the right kind of useful insects for relief, we like and sometimes it is indispensable for us to see the insects suspected or caught in the act, also specimens of the injury. In a tin with a hole or two, or a wooden box, specimens may be mailed by parcels post. When specimens are not accompanied by letter, always write your name and address in the upper left-hand corner of the package. Address all communications, DIVISION OF ENTOMOLOGY, P. O. BOX 207, HONOLULU, HAWAII.

D. T. FULLAWAY,  
Entomologist.

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GARDEN

# THE HAWAIIAN FORESTER AND AGRICULTURIST

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HONOLULU, NOVEMBER, 1920.

No. 11

Announcement of the trees available for distribution at the Government Nursery for planting on Arbor Day, held this year on November 19, is contained in this issue.

The Board's exhibit at the Maui County Fair held at Kahului on October 21 to 23, 1920, and described in this issue, received very favorable comment from the many interested spectators who viewed it.

It will be of interest to dog importers to know that Rule VIII of the Division of Animal Industry relating to the quarantine on dogs has been amended and that by the use of the anti-rabic vaccine the period of quarantine has been reduced from 120 to approximately 40 days.

Progress is being made in the improvements at the Plant Inspection Station on Kekuanaoa Street, Honolulu. A new fumigation unit is being added to the present two, a green house for holding plants in quarantine is under construction, and a fence and gates soon to be erected will serve to keep off trespassers.

The reforestation work conducted for the past several years by the Waialua Agricultural Company on the mauka lands of Kawa-iloa, Oahu, whereby 800 acres of open land have been successfully covered with a new forest, is most commendable and well illustrates what can be accomplished by persistent efforts in tree planting.

## DOG QUARANTINE REDUCED.

On November 6, 1920, the Governor approved the amendment to Rule VIII of the Division of Animal Industry, adopted by the Board on November 4, whereby dogs arriving in the Territory and coming from a country where rabies is known to exist may now be vaccinated against rabies and released after being held for thirty days for observation after the last injection.

This new procedure reduces the quarantine period from 120 days to about 40 days. The rabies vaccination may be applied to dogs a few days after their arrival, depending upon their condition of health. The treatment consists of six inoculations on six

consecutive days and causes little or no inconvenience to the patient. Since the treatment involves the use of an unattenuated virus the dogs are held for observation for 30 days after the last injection as a precaution. No cases have been recorded of dogs developing rabies as a result of this vaccination and it has been used with signal success during the past few years on thousands of animals bitten by rabid wolves and dogs in the United States.

The amended rule appears on the By Authority page in this issue.

C. S. J.

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## EXHIBIT AT THE MAUI COUNTY FAIR.

---

By CHAS. J. KRAEBEL,  
*Assistant Superintendent of Forestry.*

The Board of Agriculture and Forestry was represented at the Maui County Fair this year on October 21 to 23, by a substantial exhibit, nearly one-fifth of the entire space in the Agricultural Building having been allotted to our use. The spirit of the exhibit was educational, with the idea of showing the various lines of work controlled by the Board.

The Divisions of Entomology and Plant Inspection combined their material in a display along twenty feet of table and wall space opposite the Forestry exhibit, which occupied the middle of the building. Arranged on the side table and suspended from the wall were trays of carefully mounted insects injurious to the various fruits and crops of Hawaii, along with other insects which are parasitic upon these pests. A series of hand-colored plates pictured some of the plant diseases which are kept out of Hawaii by rigid inspection of imported plants and seeds. Fifteen small cases of mounted leaf sections illustrated the kinds of damage done by scale insects to such plants as the pineapple, pigeon pea, coffee, croton and others. Of the large insect cases, one was devoted entirely to sweet potato insects, showing the weevils, leaf roller, sphinx moth and cut-worms which infest that important food plant. A case of "agricultural insects" contained fern and mango weevils, powder post beetles, coconut leaf roller and the malicious Koa pod borer. This Koa insect destroys annually probably ninety per cent of the Koa seed crop, thus making it both difficult and costly for the Forest Nurseryman to get enough seed for reforestation purposes. Fruit flies, melon fly, leaf hoppers, cotton, corn, potato and bean insects, plant lice and dung flies—all were displayed in neat cases carefully labelled, and with each of these destructive pests was shown the insect or insects which have been found to be predaceous upon that particular pest. Considerable interest was shown by many visitors in these parasitic insects and in the explanations of the work of parasitic propagation carried on by the Division of Entomology. The im-





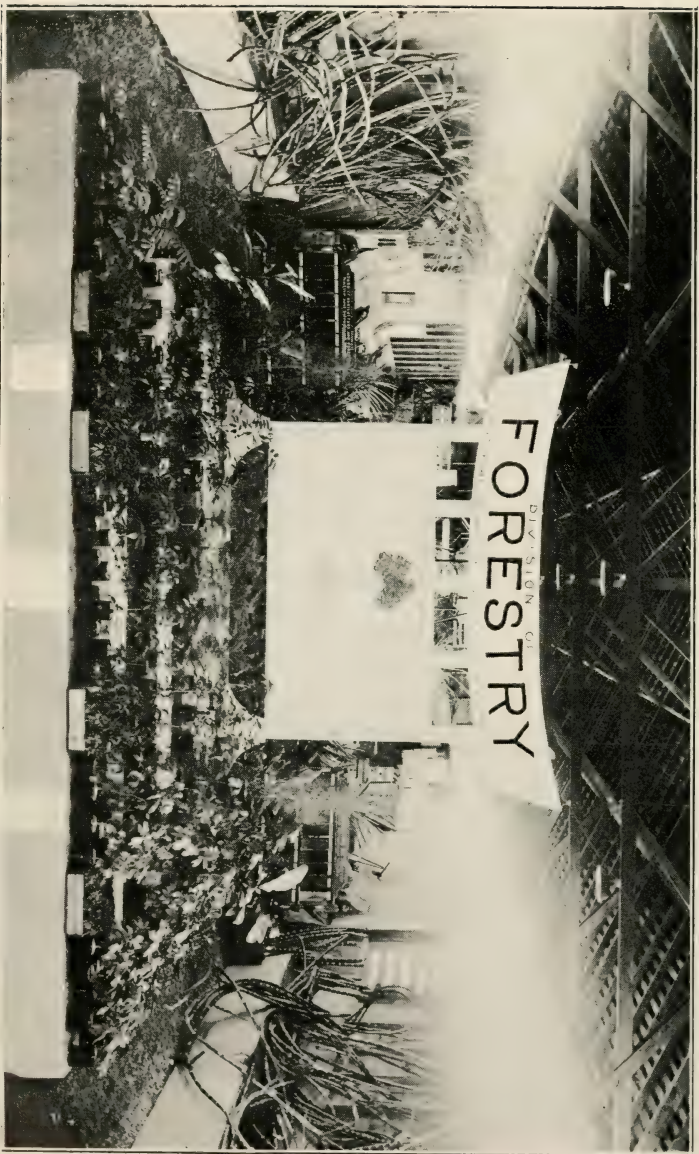


EXHIBIT AT THE MAUI COUNTY FAIR, OCTOBER 21-23, 1920.

portance of these predatory insects was emphasized because it is their predaceous activities which make tropical agriculture possible by preventing the increase, to epidemic numbers, of serious insect pests. Several collections of miscellaneous insects served to fascinate the curious with their contents of giant grass-hoppers, weird "walking sticks," and huge rhinoceros beetles. Many a shuddering gazer at these ugly creatures learned for the first time that it is only by constant vigilance on the part of the Territorial inspectors that such pests are kept out of the Hawaiian Islands.

The Division of Forestry in its exhibit also emphasized the educational features. One-half of its allotted space was occupied by a large table, 8 by 16 feet in size, covered with growing trees. The table was built up pyramid-fashion by steps and on these were placed flats of young seedlings and small trees in green-painted pots, making altogether a cool refreshing spot in the general heat and hubub of the Fair. Nearly every species of the trees used in reforestation work was represented, but there were also many ornamental and shade trees such as the showers, monkeypods, false kamani, various palms, banyans and others. One side of the table displayed several choice varieties of Eucalyptus in seedling flats and pots. From the center of the table rose a signboard in the shape of a Japanese torii with posters explaining on one side the processes of growth in a tree, and on the other carrying the following announcement:

### THESE TREES

Were raised at the Haiku Nursery at Haiku, Maui. This nursery is now operated by the Board of Agriculture and Forestry for the benefit of the people of Maui and Molokai. Forest Ranger James Lindsay is in charge and will furnish any quantity of trees for forest or ornamental planting, at cost. Next month, on Arbor Day, trees will be given free to all who want them. Get busy and *plant a tree; plant hundreds* of them! They grow while you sleep and your children's children will bless your name.

Opposite the tree table there was constructed an "erosion model" such as has been shown several times in Honolulu but which had never before been exhibited on Maui. This miniature illustration of the disastrous effects of deforestation proved of absorbing interest to many adults as well as to the hundreds of school children who paused to study it on Friday, which was set apart as children's day. The model was six feet square, and was built to slope gently forward at a convenient height. The left half of the box showed a tree-clad mossy mountain drenched by a steady spray of water which trickled by little rivulets from the base of the mountain, formed a miniature winding river, and ultimately found its way into a small clear lake. On the right a barren mountain of red earth, although "rained" upon by a spray

of the same strength as that on the forested hill, was deeply guillied on all its sides, its drainage river flowed in a deep gorge or spread out over boulder-strewn flats and built a broad delta in a very muddy lake. To emphasize the contrast, two gold fish were placed in the clear lake but these proved so distracting from the main purpose of the model that they had to be removed. Behind the mountains a poster enumerated the various advantages of forests and the disadvantages of barren slopes.

Flanking the erosion exhibit were placed three racks containing a total of ninety sawed samples of native and introduced woods which are part of the permanent forestry exhibit in the Honolulu office. A printed label on each board gave its scientific and English or vernacular names. A surprising amount of interest was shown in these samples, particularly by men and by native Hawaiians. These latter spent much time spelling out the native names and turning the boards to compare the finished and natural faces, seeing for the first time the grain of woods which they had known all their lives only as trees in the forest.

During the three days of the Fair several thousand packages of Congressional garden seeds were distributed to the citizens and school children of Maui. In the opinion of the agricultural judges the exhibits of the Board of Agriculture and Forestry were both instructive and attractive, and in recognition of this three "special premium" ribbons were awarded the display.

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## FORMOSAN TERMITES AND METHODS OF PREVENTING THEIR DAMAGE.\*

---

By MASAMITSU OSHIMA

*Of the Institute of Science, Government of Formosa*

### INTRODUCTION

One of the most serious problems in the Tropics with regard to man's industry is to discover a method of preventing the damage caused by termites. Because of their subterranean habits and insidious methods of attack, termites are very difficult to destroy. Moreover, as stated by Dr. K. Escherich:<sup>1</sup> "Nichts ist vor ihren Kiefern und zerstörenden Sekreten sicher ausser Eisen und Stein." (Nothing is safe from their jaws and destructive secretions except iron and stone). Such being the case, not only is the extermination of these insects almost impossible, but also preventive measures against their damage are difficult to apply.

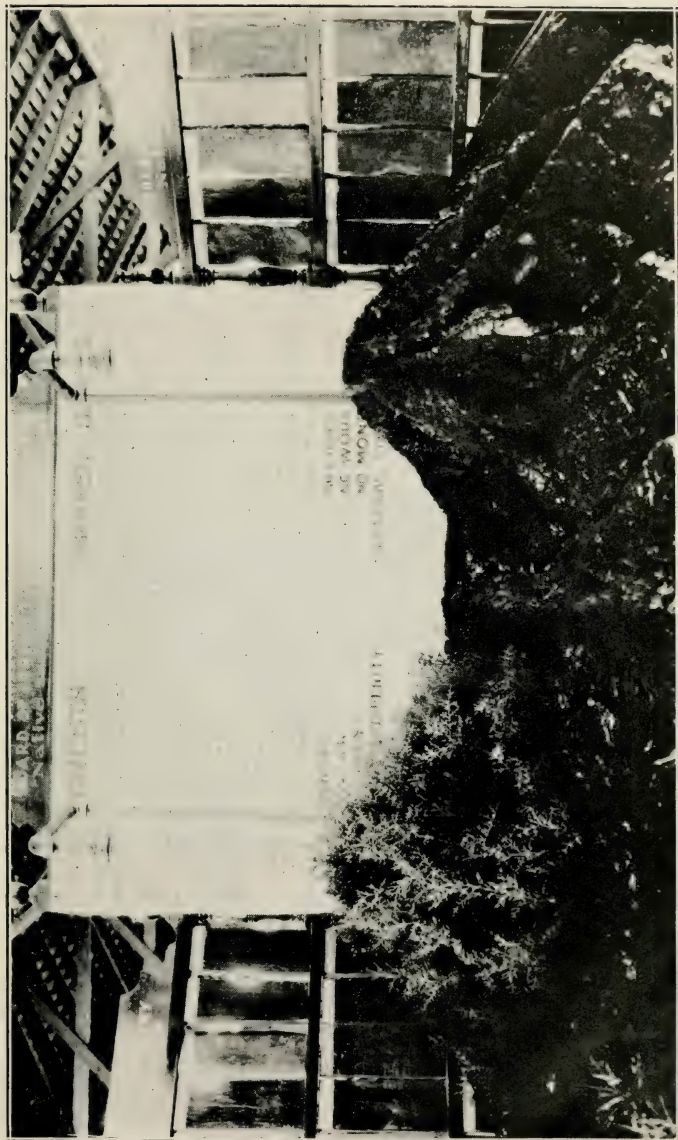
Fortunately, Japan is located in a temperate region; and, therefore, her people have not been obliged to pay attention to these

<sup>1</sup>Die Termiten (1909)

\*Philippine Journal of Science, Vol. XV, No. 4.

formidable pests. However, one species, *Leucotermes speratus* Kolbe, which very often causes somewhat serious damage to wooden structures, has been recorded in Japan since 1724. About





EROSION MODEL OF FORESTRY EXHIBIT, MAUI COUNTY FAIR.



twenty years ago, Japan occupied Formosa, which lies in a semi-tropical region; that is, in the western Pacific Ocean, between the southern and eastern China Seas. In this possession the people have been compelled to fight against the common pest of the Tropics, and the investigation of the biology of termites has become one of the most important problems of the architect and the entomologist.

In Formosa and in Japan there are fourteen species of termites, four of which, namely *Coptotermes formosanus*, *Leucotermes speratus*, *Leucotermes flaviceps*, and *Odontotermes formosanus*, are known as pests of wooden structures. *Coptotermes formosanus*, which is distributed in Formosa, Riu Kiu Islands, and in the southern parts of Japan proper, is especially formidable to buildings. It is certain that the other three attack wood-work, and wooden structures as well, but their ravages are negligible in comparison with those of *Coptotermes formosanus*.

During the last ten years, I have been investigating the Japanese termites, especially the habits of *Coptotermes formosanus*. I approached the problem of the method for prevention with the following ideas as a working basis:

1. Some changes are necessary with regard to the construction of buildings in the Tropics in order to prevent damage by termites.
2. The value of termite-proof building construction is not absolute, unless all sorts of nonresistant timbers are eliminated from the building materials.
3. If it shall be proved that the elimination of nonresistant timbers is practically impossible, it becomes necessary to treat them chemically or physically in order to confer a special resistant property.
4. It is necessary to prove whether or not there are naturally resistant timbers in the Tropics.
5. If there are naturally resistant timbers, an investigation with the object of discovering the cause of resistance becomes important.
6. If the causes are definitely known, methods of artificially treating nonresistant timbers will be more easily discovered.

## CERTAIN HABITS OF COPTOTERMES FORMOSANUS SHIRAKI

### DIFFERENT CASTES IN THE COLONY

Generally the members of a termite colony differ greatly at different times of the year. Eggs and newly hatched larvæ of *Coptotermes formosanus* are most numerous in the summer; winged forms and nymphs are not present after the swarming season (from the end of May to the beginning of June); nymphs increase in number in the spring, becoming most abundant in April; at the end of May the nymph changes to an imago and usually swarms during the first ten days of June. A complete colony contains the following castes:

1. Newly hatched larvae. The heads of all are alike in dimensions and provided with 10-jointed antennae.

2. Larvae of soldier, derived from 1. Distinctly differs from the other castes in having somewhat elongate, toothless mandibles and suborbicular head.
3. Larvae of worker, derived from 1. Large-headed and provided with clearly denticulated mandibles, the tip and the inner margin of which are more or less brown.
4. Larvae of royal form, derived from 1. Small-headed; other external characters are similar to those of worker larvae.
5. Nymph of royal form. The members of this caste are provided with two pairs of wing pads and one pair of nonpigmented eyes and ocelli; body milk white.
6. Winged forms with pigmented eyes. Body reddish brown. At the beginning of May vast numbers of this caste are found in the nests; they emerge from the old nest early in June.
7. A single queen, derived from a female of the winged form. Abdomen greatly enlarged, with two pairs of triangular wing stumps on the thorax.
8. A single king, derived from a male of the winged form. Abdomen normal, with two pairs of triangular wing stumps on the thorax.
9. Substitute royal forms. It is certain that there are several kings and queens belonging to this class; however, the substitute king is not known. The substitute queen which was collected in Kiushiu by Mr. Tatsuo Yoneyama, engineer of the Imperial Railway, is 12 millimeters long; head yellow, abdomen milk white, thorax with no wing stumps. This caste is very rare in the colony of *Coptotermes formosanus*. According to Yoneyama's information, the nest which contained this queen was orphaned and some fifteen of the same form were captured at the same time.

#### THE FOUNDATION OF A NEW COLONY

In Formosa the swarming of *Coptotermes formosanus* takes place at the end of May or early in June, while in Japan proper the winged individuals swarm a little later; that is, at the end of June.

After the adults have rapidly emerged from the parent nest in a vast swarm and have flown a short distance in an irregular, wobbly manner, they fall to the ground. As soon as they reach the ground, they cast the wings. Then the male is attracted to the female and follows her tirelessly and closely, performing the so-called "Termiten Liebes-Spaziergang." In this manner the imagoes separate into pairs and enter hiding places in order to establish new colonies, usually under pieces of decaying wood, in holes and crevices in wood, or directly in the earth.

In order to observe the starting of a new colony, many new couples were captured in glass tubes.

The bottom of a test tube, 2 by 16 centimeters, is bored with a capillary pore, and a piece of absorbent cotton is inserted. Then a proper quantity of crushed clay is placed in the tube to serve as the abode of the future colony; upon this layer pieces of soft wood or cotton are laid for food. A male and a female that have recently flown from the nest are now placed in the tube, which is tightly corked and put in a dark place.

In order to keep captive termites in a healthy condition, it is absolutely necessary to give them proper humidity. This is done



by placing the end of the tube in water, thus allowing the absorbent cotton to draw a sufficient amount of water through the pore. As a result of these investigations, the following facts were determined:

1. During the first stage of colonization both the male and the female are active. They forage for themselves and are equally important in establishing the new colony and in rearing the first brood of young.
2. Egg laying in a newly established colony begins from five to thirteen days after the swarming.
3. The rate of egg laying is not rapid in the first batch, one to four eggs being laid on one day.
4. Eggs hatch out in from twenty-four to thirty-two days after they are laid.
5. After five months of captivity, the nests in two of the tubes were opened. In these there were no unhatched eggs; the king and the queen, which still retained the normal form of the imago, ran actively, in company with rather small individuals of the worker type and soldiers. The number of individuals in each nest agreed well; one contained twenty-two individuals of the worker type and two soldiers, the other, twenty individuals of the worker type and three soldiers. These facts clearly show that about twenty-five eggs compose the first batch in a newly established colony, and that no more eggs are laid until the eggs of the first brood are all hatched.
6. In the first brood the soldiers are few in comparison with individuals of the worker type, about 10 per cent of the number of the latter being soldiers.
7. Soldiers hatch from the eggs that are laid by true royal females.<sup>2</sup>

#### SITUATION OF THE NEST

*Coptotermes formosanus* does not construct a large mound as do some species in the Tropics. Usually it makes its nest in the ground at a depth of from 6 to 10 feet (1.82 to 3.04 meters). Very often the nest is made at the junction of rafters of buildings or in the inner part of infested timbers, in wooden boxes or cabinets, or in the interspaces in walls. Generally the nest is round and honeycombed, and in the center there is a small, slitlike royal chamber.

The nest consists of a mixture of abdominal excreta and clay or sand, pasted together with a special secretion of the salivary glands. Sometimes it is rigid and compact and seems like a piece of rock. However, it is inflammable and burns rapidly, leaving a small amount of ash.

<sup>2</sup>As it is almost impossible from external characters to draw a fast line between larvae of royal forms and of workers, nothing at present can be said with regard to the origin of these two forms.

#### DAMAGE TO BUILDINGS AND OTHER MATERIALS

*Coptotermes formosanus* is essentially a wood destroyer and attacks very seriously all sorts of woodwork and wooden structures. Because of its habit of attacking Japanese pine, which is an important building material, it is classed as a most formidable pest throughout Formosa. Moreover, as the method of attack

of this insect is insidious, usually leaving the outer layer of wood intact as a protective covering from sunlight and its natural enemies, so that the damage is always hidden until beyond repair, it is a most dangerous enemy to buildings.

In infesting buildings it generally gains entrance from outdoor colonies. By means of subterranean tunnels of considerable length, which originate from a nest in the ground, it reaches the foundation of a building. At first it attacks foundation timbers, flooring, or supports of porches or steps that are in contact with the ground, and gradually extends its tunnels and excavation into the first, the second, or even the third floor and into the roof, passing through the walls or the interior of timbers.

In cases where the foundation is of stone, concrete, or other impermeable material, it constructs a covered tunnel of a mixture of earth and saliva over the surface and reaches the woodwork. Generally a cross section of this artificial tunnel is semicircular, the diameter being from 5 to 10 millimeters.

*Damage to buildings.*—Ordinary Japanese houses are chiefly constructed of wood and clay, the foundation timbers being laid in contact with the ground. Thus the construction itself is not fitted to prevent the attack of termites. Moreover, Japanese pine and cryptomeria, which are most liable to be attacked by *Coptotermes formosanus*, are the principal building materials. Such being the case, the Japanese people suffer a great deal from the damage when they erect buildings of their own style in Formosa.

As the work of *Coptotermes formosanus* is hidden, it is difficult to detect the presence of the insects or the damage that they are doing. After they have caused the fall of a building, the beams, the rafters, and other important parts of the woodwork are often found to be mere shells, the interior being entirely honey-combed.

*Damage to brick walls.*—There are several records in Formosa of modern brick buildings having been infested by *Coptotermes formosanus*. It is absolutely impossible for it to attack brick itself; but, according to my actual observation, the mortar which is used as a cementing material for bricks is subject to attack.

In building a thick brick wall the following method is adopted: The face bricks are laid upon a bed of mortar; the mortar, in a semifluid condition, is then poured into the space between the face bricks; the bricks are then pushed rapidly, horizontally for a short distance, into their position; a certain amount of the mortar is thus displaced; this rises in the side joints and completely fills all the interstices; should the mortar not rise to the top of the joints, the vacant spaces are filled up, when the next course is larried.

All the interstices between the bricks would be completely filled, if the bedding could be carried on theoretically; but this is practically impossible, so that there are almost sure to be voids in brick walls. Under such conditions, termites prefer to pass

through brick walls, if they have a chance to permeate them, rather than to excavate ordinary walls; because the voids are always in a favorable condition for their life, being protected from the sunlight and containing a proper amount of moisture.

There are two kinds of mortar used for constructional work; namely, cement mortar and lime mortar. The former is composed of sand and Portland cement (the ratio of Portland cement to sand is from one to two to one to four), while the latter is composed of moderately hydraulic lime and sand (the ratio of lime to sand is usually one to two).

In Formosa until a comparatively recent date lime mortar was exclusively used for the bedding of bricks. It has been found, however, that *Coptotermes formosanus* easily penetrates brick buildings and causes serious damage. Since the Government has required the use of cement mortar instead of lime mortar there has been no record of damage to brick walls. Therefore, it seems reasonable to conclude that there exists some special relationship between lime and the destructive power of *Coptotermes formosanus*.

The soldier of *Coptotermes formosanus* is provided with a special gland on the forehead, which secretes a milky, acidulous fluid; its excreta and saliva are also acidulous, while those of the worker are alkaline. In the passages perforating the lime mortar of brick walls vast numbers of soldiers are found. Such being the case, it is said that the soldier of *Coptotermes formosanus* attacks lime mortar by dissolving the lime with the acidulous secretions.

*Damage to railway sleepers.*—*Coptotermes formosanus* attacks railway sleepers as well as buildings. According to a statement of the Bureau of the Formosan Government Railway, the life of an untreated, chestnut sleeper is only two years in Formosa, while in Japan proper it is from eight to ten years.

In the southern part of Formosa another species of termite, *Odontotermes formosanus*, also attacks the sleepers.

The damage it causes is rather more serious than that caused by *Coptotermes formosanus*. Therefore, in the case of sleepers, it is important to prevent the damage caused by these two species. Usually the length of the spike which is used to fix the rail to a sleeper is a little greater than the depth of the latter, so that its tip always penetrates beyond the bottom of the sleeper, causing some damage to that surface. This point is most liable to be attacked. As the pests excavate the wooden tissue surrounding the spike, the latter becomes ineffective. Suppose such damage occurs successively in several sleepers; the results are quite obvious—the rails spread and cause great danger to passing trains.

*Damage to ships.*—One can hardly believe that steamships and launches in the water have been attacked by *Coptotermes formosanus*; but it is an undeniable fact. There are many records of such cases in the harbor of Keelung, Formosa. It happens in this way. In the swarming season, many thousands of winged



males and females start from the nests in the vicinity of the shore. Some of them have a chance to fly into the ships moored in the harbor and there start new colonies. The interior of the ship is dark enough to favor the establishment of a nest. Usually the bottom of the ship is constructed of Japanese pine, which is most durable in water; all the timbers contain a favorable amount of water. Thus, all conditions being exceedingly favorable to *Coptotermes formosanus*, the ravages are extended step by step, until the vessel becomes unseaworthy, because of the unexpected destruction of important parts of the woodwork. In such a case extermination of the pests is very difficult. When the Government trawler *Ryokai-maru* was found to be infested, it was purposely sunk in the sea in order to destroy the insects.

Besides the above-mentioned damage, that done to bridges, telegraph poles, books, paper, wood pulp, cotton, and clothing is sometimes very serious.

#### PRINCIPAL FOOD OF COPTOTERMES FORMOSANUS

The stem of an exogenous perennial is a complex of structural elements of varied form and function. Of these we may distinguish three main groups: *a*, vessels; *b*, wood cells proper; *c*, medullary tissue. The growing cell of plant tissue consists of cell wall and protoplasm, the living functions depending upon the activity of the latter. However, the above-named three main structural elements of the wood do not contain nitrogenous substance—that is, protoplasm—but mainly consist of the special constituent of the cell wall known as cellulose.

There are, as might be expected, a great many varieties of cellulose, and the term must be taken as denoting a chemical group. Cellulose, taken as a group, presents the following characteristic: A colorless substance, insoluble in all simple solvents; generally but variously resistant to oxidation and hydrolysis; nonnitrogenous, having the empirical constitution characteristic of the carbohydrates. The composition of pure cellulose is represented by the percentage numbers C 44.2, H 6.3, O 49.5, corresponding to the empirical formula  $(C_{10}H_{10}O_5)_x$ . It is flexible, slightly elastic, permeable, but only slightly absorbent, and does not readily undergo fermentation. When treated with acid it passes into a starchlike condition, as is evidenced by its turning blue with iodine; and under certain conditions in the living plant it would seem capable of being formed from sugar or of passing into it.

It must be noted, however, that the typical cellulose is not separated from the plant in a pure state, but in admixture or in intimate chemical union with other compounds or groups of compounds. The latter are distinguished by greater reactivity; for example, they readily yield to alkaline hydrolysis, to oxidation, or to the action of the halogens. In the latter is included the very important group of lignified cellulose, or lignocellulose,



distinguished by the presence of ketohexene groups in union with the cellulose, and therefore combining directly with the halogens.

Generally, walls of cellulose, fibres, and vessels in the wood acquire mechanical strength or resistance by undergoing a change known as lignification. This consists in their impregnation with a substance known as lignin, forming a compound cellulose, namely, lignocellulose. Lignin, like cellulose, consists of three elements—carbon, hydrogen, and oxygen—but in different proportions, its percentage composition being C 49, H 6, O 44. Its chemical constitution is as yet unknown. It is harder and more elastic than cellulose, readily permeable by water, but not absorbent. It is more soluble in acids than is cellulose and is recognized by turning deep magenta when treated with phloroglucinol in hydrochloric acid.

As shown in the preceding pages, *Coptotermes formosanus* seriously injures all sorts of woodwork and wood products. However, why it attacks such materials or, in other words, what was the principal food of *Coptotermes formosanus* contained in wood was quite unknown. In order to settle this question the following experiments were made:

*Experiment 1.*—A living worker or soldier of *Coptotermes formosanus* was placed on a microscope slide, and the tip of its abdomen was pressed, the excrement being thus discharged. This was treated with phloroglucinol in hydrochloric acid under a cover glass. The color changed to deep magenta, showing the characteristic reaction of lignin.

*Experiment 2.*—A piece of the nest was treated with the same reagent. It also gave a deep magenta coloration, characteristic of lignin.

*Experiment 3.*—A piece of camphor wood and a nest of *Coptotermes formosanus* made from camphor wood were analyzed.

It is quite obvious that the amount of cellulose is the main difference between the constituents of the camphor wood and those of the nest. As there occurs no decrease of noncellulose, it is clear that cellulose has been taken as the food when the camphor wood passed through the alimentary canal; and non-cellulose, that is, lignin, which is produced as a decomposed material of lignocellulose by the special function of the alimentary canal, is discharged as the building material of the nest.

(To Be Continued.)

## DIVISION OF FORESTRY.

### REPORT OF SUPERINTENDENT OF FORESTRY, OCTOBER, 1920.

Honolulu, November 13, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—I respectfully submit the following routine report of the Division of Forestry for the month of October, 1920:

### FOREST FENCING

Soon after my return from extended leave on October 26, attention was given to closing up two gaps in fences on forest reserve boundaries where it is important to keep out cattle. One of them, at the end of the fence between Waika and Kawaihae I in the Kohala Mt. Forest Reserve, Hawaii, consists of a stretch of about 1000 feet at the edge of Honokane Gulch and Ranger Harry L. Denison has been requested to arrange for the necessary construction. The other consists of an uncompleted gap about half a mile in length on the mauka boundary of the Kula Forest Reserve, Maui, between Kanahau and Kalepeamoa at the end of the fence constructed last fall in cooperation with the Raymond Ranch. The wire for this gap was sent up to Maui some time ago but since the Raymond Ranch has found it impossible to erect the fence, efforts are being made to have it constructed by the Kaonoulu Ranch.

Ranger Mackenzie on Hawaii reports that the fence being built by Y. Tanaka in cooperation with this Division to protect the forest along the Volcano road in Olaa between 19 and 22 miles on Hawaii is nearing completion. This fence is approximately 2.5 miles in length.

### FOREST PLANTING

As will be seen by the Forest Nurseryman's report, tree planting has continued on three areas on Oahu, viz. Makiki, Lualualei and Waiahole, a total of 1,252 trees being set out. These consisted of koa, Johore ficus, Australian red cedar, Norfolk Island pine, kauri pine, and Japanese cedar. The main attention of the planting crews was given during the month to weeding trees already planted.

### CATTLE TRESPASS

The District Forester at Waianae, Oahu, on October 28, reported the trespass of 25 head of tame cattle on the Waianaekai Forest Reserve. These he had removed from the reserve but since this is a repetition of what had previously occurred, in spite of warnings to the contrary, the matter was at once referred to the Attorney General with the request that, if the evidence was sufficient, he proceed against the owner for violation of Rule II, which forbids the grazing of cattle in forest reserves. The Attorney General has doubts as to the sufficiency of the evidence but still has the matter under consideration.

In this connection the law concerning the powers of this Board to rid the reserves of cattle is being studied with the view of improving it at the next regular session of the Legislature.

### MAUI COUNTY FAIR

The Division was represented at the Maui County Fair held at Kahului on October 21-23, by an exhibit of trees grown at the Haiku Nursery, by charts, and by the working erosion model showing the beneficial effects of a forest cover on the runoff.

### FOREST PROTECTION

Several conferences were held with Dr. Lyon of the H. S. P. A. on forest protection matters mainly in connection with the Hilo and Kohala Mts. Forest Reserves.

Respectfully submitted,

C. S. JUDD,  
Superintendent of Forestry.

# REPORT OF THE ASSISTANT SUPERINTENDENT OF FORESTRY, OCTOBER, 1920.

Honolulu, November 13, 1920.

Superintendent of Forestry, Honolulu, T. H.

Dear Sir:—The following statement of my activities during the month of October is respectfully submitted:

The first ten days of the month were taken up with matters relating to my September trip on Maui, such as legending for permanent record the photographic negatives made during the trip and making a general study of the history of the several reserves from material in the files.

With regard to the dying forest in the Koolau Reserve, Maui, I read all the published articles and reports on this matter and had an interview with Dr. Lyon concerning his studies in the field. Because of the absolute dependence of the large sugar plantations on central Maui upon the water drawn by the Big Ditch system from the water conserving forest, the Planters' Experiment Station is planning extensive experiments to find exotic trees which will thrive in localities where the native species are dying. Efforts will concentrate largely upon the genus *Ficus* and upon the introduction into Hawaii of the insects necessary to the fertilization of the seed of that genus so that it may spread by natural reproduction. It is altogether logical that this serious forestry problem be attacked by the interests which will be most directly benefitted by its solution, particularly so in view of the fact that the appropriations of the Division of Forestry are at present inadequate to undertake the work on so large a scale.

Following this several days were spent in assembling material, making posters, etc. for the forestry exhibit at the Maui County Fair. I left for Maui on October 18, and returned to Honolulu on October 28, the extra days before and after the Fair being needed to assemble and disassemble the exhibit. A brief illustrated article has been prepared for the "Forester and Agriculturist" giving a detailed description of the exhibit.

Respectfully submitted,

C. J. KRAEBEL.

Assistant Superintendent of Forestry.

## REPORT OF FOREST NURSERYMAN, OCTOBER, 1920.

Honolulu, November 24, 1920.

Superintendent of Forestry, Honolulu.

Dear Sir:—I herewith submit a report of the work done during the month of October:

### NURSERY

Distributions of Plants—

	In Seed	In Trans- plant	Pot	
	Boxes	Boxes	Grown	Total
Sold .....		150	51	201
Gratis (including forest reserves) .....	5,000	....	613	5,613
Total .....	5,000	150	664	5,814

## COLLECTIONS

## Government Realizations—

Collections on account of plants sold .....	\$ 2.20
Plants sold at Kalaheo Nursery, Kauai (Joe Rita, Jr.).....	12.25
Rent of office, Nursery grounds, for September .....	35.00

Total .....\$49.45

## Animal Industry Revolving Fund—

Dr. A. R. Glaisyer (Anti Rabie Vaccine) .....	\$ 6.00
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## MAKIKI STATION

The work at this station has been principally routine. We have a large supply of plants on hand for the coming planting season.

## HONOLULU WATERSHED

The work done on the watershed consisted of clearing trails, clearing brush, etc., away from the trees and preparing ground for planting. Eighty koa trees were planted.

## HILO SUB-NURSERY

Bro. M. Newell reports the distribution of 296 trees in transplant boxes.

## HAIKU SUB-NURSERY

Mr. James Lindsay states in his report that he distributed 855 trees in transplant boxes and 83 pot-grown plants. Total 938.

## KALAHEO SUB-NURSERY

Joe Rita, Jr., gives the number of trees distributed as 500 in tins.

## LUALUALEI, WAIANAE

J. K. Luka reports the planting of trees for October as follows:

Ficus Johore .....	432
Cedrela Australis .....	520

Total .....952

## WAIHAOLE FOREST RESERVE

Alfred Rocha, in his report for October, gives the trees planted as follows:

Australian Red Cedar .....	150
Kauri Pine .....	30
Norfolk Island Pine .....	20
Japanese Cedar .....	20

Total ..... 220

## ADVICE AND ASSISTANCE

The writer at the request of Mr. Wm. Harpham paid a visit and spent one day in examining the forest work that is being carried on by the Waialua Agricultural Company. This company has now about 800 acres in planted forest. In addition to a large number of eucalyptus, groves of grevilleas, Australian red cedar, Sugi (Japanese Cedar), Casuarina—two species (Ironwood), Cypress, etc., are to be found in a flourishing condition. A well-stocked nursery, containing many thousands of trees, consisting principally of Australian red cedar, Kauri gum tree, Sugi (Japanese Cedar), Macadamia nut and a number of Eucalyptus, is to be found at Mr. Harpham's home at Kawailoa. The work done in this



line is certainly very creditable and will undoubtedly prove of great value to the company in years to come. The careful and able work done by Mr. Harpham is very commendable.

The writer spent four days on Maui during the Fair, and assisted in judging the flowers and plants and doing other work in connection with the Forestry exhibit. The nursery at Haiku was visited and found in excellent shape.

Six visits were made during the month to render advice and assistance to various places in and around the city and eight people calling at the nursery also received assistance. Requests are also on file to call at the following places: Fort Kamehameha, Pearl Harbor Hospital, Submarine Base at Pearl Harbor, Fort Shafter and the Arsenal.

Respectfully submitted,

DAVID HAUGHS,  
Forest Nurseryman.

## DIVISION OF ENTOMOLOGY.

### REPORT OF THE ENTOMOLOGIST, OCTOBER, 1920.

Honolulu, November 24, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—During the month of October the insectary handled 24,200 pupae of the melon fly from which there were bred 5053 females and 4360 males (*Opius fletcheri*.)

The distribution of parasites was as follows:

#### MELON FLY PARASITE

##### *Opius fletcheri*.

	Females.	Males.
Oahu:		
Mōiliili .....	1250	1150
Kalihi .....	200	200
Kapahulu .....	300	300
Moanalua .....	300	300

#### FRUIT FLY PARASITES

##### *Opius humilis*

Oahu:		
Kalihi .....	50	50

##### *Dirhinus giffardi*

Oahu:		
Nuuanu Ave. ....		900

##### *Diachasma fullawayi*.

Oahu:		
Kalihi .....	300	300

##### *Tetrastichus giffardianus*.

Oahu:		
Kalihi .....		300

##### *Diachasma tryoni*.

Oahu:		
Kalihi Valley .....	300	300

*Galesus silvestri.*

Oahu:  
Nuuanu Ave. ....1120

## DUNG FLY PARASITE

*Spalangia cameroni.*

Oahu:  
Moanalua .....1600

Respectfully submitted,

D. T. FULLAWAY,  
Entomologist.

## DIVISION OF PLANT INSPECTION.

## REPORT OF THE CHIEF PLANT INSPECTOR, OCTOBER, 1920.

Honolulu, October 30, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—I respectfully submit my report of the work carried on by the Division of Plant Inspection for the month of October, 1920, as follows:

During the month 64 steamers arrived at the Port of Honolulu, 24 of which carried vegetable matter and 12 vessels came through the Canal Zone. The following disposal was made of the various shipments:

Passed on free as from pests :...	1232 lots	37,282 pkgs.
Fumigated .....	5 "	5 "
Burned .....	70 "	70 "
Returned .....	1 "	1 "
Total inspected .....	1308 lots	37,358 pkgs.

Of these shipments 37,062 packages arrived as freight, 163 packages as baggage and 133 packages as mail.

## RICE AND BEAN SHIPMENTS

During the month 21,219 bags of rice from Japan, 80 matts of rice from China and 2794 bags of beans from Japan arrived clean.

## PESTS INTERCEPTED

Approximately 5137 pieces of baggage belonging to immigrants from foreign countries were examined, from which 36 lots of vegetables and 28 lots of fruit were seized and destroyed.

On October 1 a package of corn and a plant in the baggage of passengers from Japan were seized and destroyed.

On October 5 a Java Sparrow arriving from the coast for Mr. S. Stephenson was killed with HCN, it being prohibited.

On October 6 a package of barley from Japan in the mail was seized and destroyed as contraband. A package of pea seeds, also in the mail from Japan was fumigated on account of weevils.

On October 13 a package of seeds in the mail from Japan was fumigated on account of weevils.

On October 18, per Santa Cruz, a package of herbs containing rice paddy was found in the mail from Manila. The rice paddy was burned also wrapper of cocoanut leaves, showing disease was destroyed. On

the same date, per Meiyō Maru, a package of Betel nuts, in the mail from Manila was fumigated, being infested with lepidopterous larvae.

On October 20 a lot of corn and a plant in the baggage of a passenger from Japan was seized and burned. A package of paddy rice from Manila in the mail was burned; a package of beans in the mail from Japan was fumigated precautionary; a package of nuts in the Manila mail was fumigated on account of weevils.

On October 22 a package of Daffodil bulbs was found in the mail from California. Upon inspection two of the bulbs were found infested with the Bulb-fly (*Merodon equestris*). These were burned and the rest fumigated and passed.

### HILO INSPECTION

Bro. Newell, inspector at Hilo, reports the arrival of 9 steamers at Hilo. Seven carried vegetable matter consisting of 301 lots and 6985 parcels, all clean; 5033 bags rice and 493 bags beans arrived from Japan and were passed.

### KAHULUI INSPECTION

Mr. L. Gillin, inspector at Kahului, reports 6 vessels arriving at Kahului. Two carried vegetable matter consisting of 18 lots, 2104 parcels, all passed as free from infestation.

### INTER-ISLAND INSPECTION

Fifty-six steamers plying between Honolulu and other island ports were attended and the following shipments passed:

Taro .....	488 bags
Vegetables .....	341 pkgs.
Fruit .....	424 pkgs.
Plants .....	127 pkgs.
Pine Shoots .....	8,607 bags
Sugar Cane .....	44 cases
Seeds .....	6 pkgs.

Total passed ..... 10,037 pkgs.

Sixty-four packages of plants and 1 package of fruit were rejected on account of infestation, undesirable soil and non-compliance with rules.

Respectfully submitted,•

E. M. EHRHORN,  
Chief Plant Inspector.

## DIVISION OF ANIMAL INDUSTRY.

### REPORT OF ASSISTANT TERRITORIAL VETERINARIAN, OCTOBER, 1920.

Honolulu, November 18, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—I beg to submit the following routine report for October:

#### TUBERCULOSIS CONTROL

Work in this line was confined to retesting the imported Holstein bull at the Quarantine Station which had reacted to the test two months

previously. The bull responded quickly to the test, showing a reaction about three times the size of the previous one. This bull was injected on October 16 in the morning and at 3 p. m. showed a decided reaction. This reaction reached its maximum size on October 18 and remained in evidence until the day it was slaughtered, October 30.

Post-mortem examination revealed evidence of advanced tuberculosis, the following lesions being found:

Nodules in both retro pharyngeal glands; right laryngeal gland greatly enlarged and filled with numerous tuberculosis centers; nodules in the posterior mediastinal gland and diaphragmatic lobe of the right lung; one small nodule in the right epididymis.

Besides the above, three steers condemned in Kona by Dr. Rowat and sent here for slaughter were post-mortemed, all showing typical lesions of tuberculosis.

### SWINE PLAGUE AND NECROTIC ENTERITIS

A considerable outbreak of mixed infection occurred among a herd of swine at Nanakuli:

**History:** About two weeks before the outbreak was reported pigs had been dying a few at a time until 15 or 20 had been lost.

**Sanitary Conditions:** The sanitary conditions surrounding these hogs were far from good. Although the man in charge asserted that he cleaned the feed troughs every day they bore no evidence of it. The wallowing pool was filthy, being filled with heavily polluted water with a floating green scum. There was no drainage and it looked as if it had been many months since it was drained and cleaned.

**Symptoms and Diagnosis:** Upon arrival seven or eight young pigs were found in various stages of the disease. They were emaciated, with weak staggering gait, with occasional cough and diarrhea. A diagnosis of mixed infection was made.

**Post-Mortem Examinations:** One of these sick hogs was killed and a careful post-mortem examination made with the following result:

A pneumonia of the swine plague type involved the lungs; the heart showed a few petechae on the epicardium and endocardium; the lymph glands throughout the body were slightly swollen and hemorrhagic. A diffuse necrotic enteritis was revealed throughout almost the entire length of the large intestines. These post-mortem findings fully substantiated the diagnosis made.

**Treatment:** All the hogs, sick and well, which could be corralled were injected with mixed infections bacterins (swine) obtained from the Jensen-Salsbery Laboratories and necro-bacillosis powder administered in the feed. The owner was advised to have the hogs removed to a new, clean place and kept in a sanitary condition.

The effects of the treatment were not immediately apparent, first, because of the severity of the outbreak and secondly the unhygienic conditions under which they were kept. It is significant that all deaths stopped upon removal of the animals to clean surroundings.

### ANTI-RABIC VACCINATION

During the past month 15 dogs were vaccinated against rabies. No untowardness developed in any during the period of vaccination.

### IMPORTATION OF LIVE STOCK

During the past month 50 vessels entering the port of Honolulu were boarded and inspected by the Live Stock Inspector, out of which number six were found to carry live stock for this Territory:

Horses	Mules	Cattle	Swine	Dogs	Poultry
3	42	52	6	2	184 crates

Respectfully submitted,

L. N. CASE,  
Assistant Territorial Veterinarian.



Available, Free of Charge, at the Government Nursery, 1438 S. King Street, for Arbor Day Planting (November 19th, 1920).

### LIST OF TREES

Common Name	Scientific Name
Golden Shower .....	<i>Cassia fistula</i>
Pink Shower .....	<i>Cassia grandis</i>
Pink and White Shower .....	<i>Cassia nodosa</i>
Royal Poinciana .....	<i>Poinciana regia</i>
Yellow Poinciana .....	<i>Peltophorum ferrugineum</i>
Jacaranda .....	<i>Jacaranda mimosaeifolia</i>
St. Thomas Tree .....	<i>Bauhinia tomentosa</i>
Pepper Tree .....	<i>Schinus molle</i>
Christmas Berry .....	<i>Schinus terebinthifolius</i>
Monkey Pod .....	<i>Pithecolobium saman</i>
Silk Oak .....	<i>Grevillea robusta</i>
Milo .....	<i>Thespesia populnea</i>
Mahogany .....	<i>Swietenia mahagoni</i>
Ironwood .....	<i>Casuarina equisetifolia</i>
Monterey Cypress .....	<i>Cupressus macrocarpa</i>
Arizona Cypress .....	<i>Cupressus arizonica</i>
Cook Pine .....	<i>Araucaria cookii</i>
Australian Red Cedar .....	<i>Cedrela australis</i>
Lemon Gum .....	<i>Eucalyptus citriodora</i>
Swamp Mahogany .....	<i>Eucalyptus robusta</i>
Royal Palm .....	<i>Ocrodora regia</i>

Orders for trees should be addressed "Government Nursery, P. O. Box 207, Honolulu" and should be in our hands not later than November 15th, and the plants will be ready for delivery on and after November 18th. Each applicant is entitled to twenty-four (24) trees.

The other islands will be supplied at the following sub-nurseries:

Hawaii—Hilo sub-nursery, in charge of Bro. M. Newell.

Maui and Molokai—Haiku sub-nursery, in charge of James Lindsay.

Kauai—Kalaheo sub-nursery, in charge of Joe Rita, Jr.

### BY AUTHORITY.

TERRITORY OF HAWAII.  
BOARD OF COMMISSIONERS OF AGRICULTURE AND  
FORESTRY

### AMENDMENT TO RULE VIII—DIVISION OF ANIMAL INDUSTRY.

The Board of Commissioners of Agriculture and Forestry of the Territory of Hawaii hereby amends Rule VIII of the Division of Animal Industry to read as follows:

Rule VIII—Dogs. Sec. 1 (a). All dogs arriving in the Territory of Hawaii and coming from or through any country, state, or territory where rabies is known to exist, shall be kept in quarantine on premises provided by this Board for a period of one hundred and twenty (120) days counting from the date of embarkation, or may be vaccinated against rabies and held for observation for thirty (30) days after the last injection.

Sec. 1 (b). The above amendment shall take effect upon approval by the Governor.

Approved this sixth day of November, 1920.

C. J. McCARTHY,  
Governor of Hawaii.

Honolulu, T. H.

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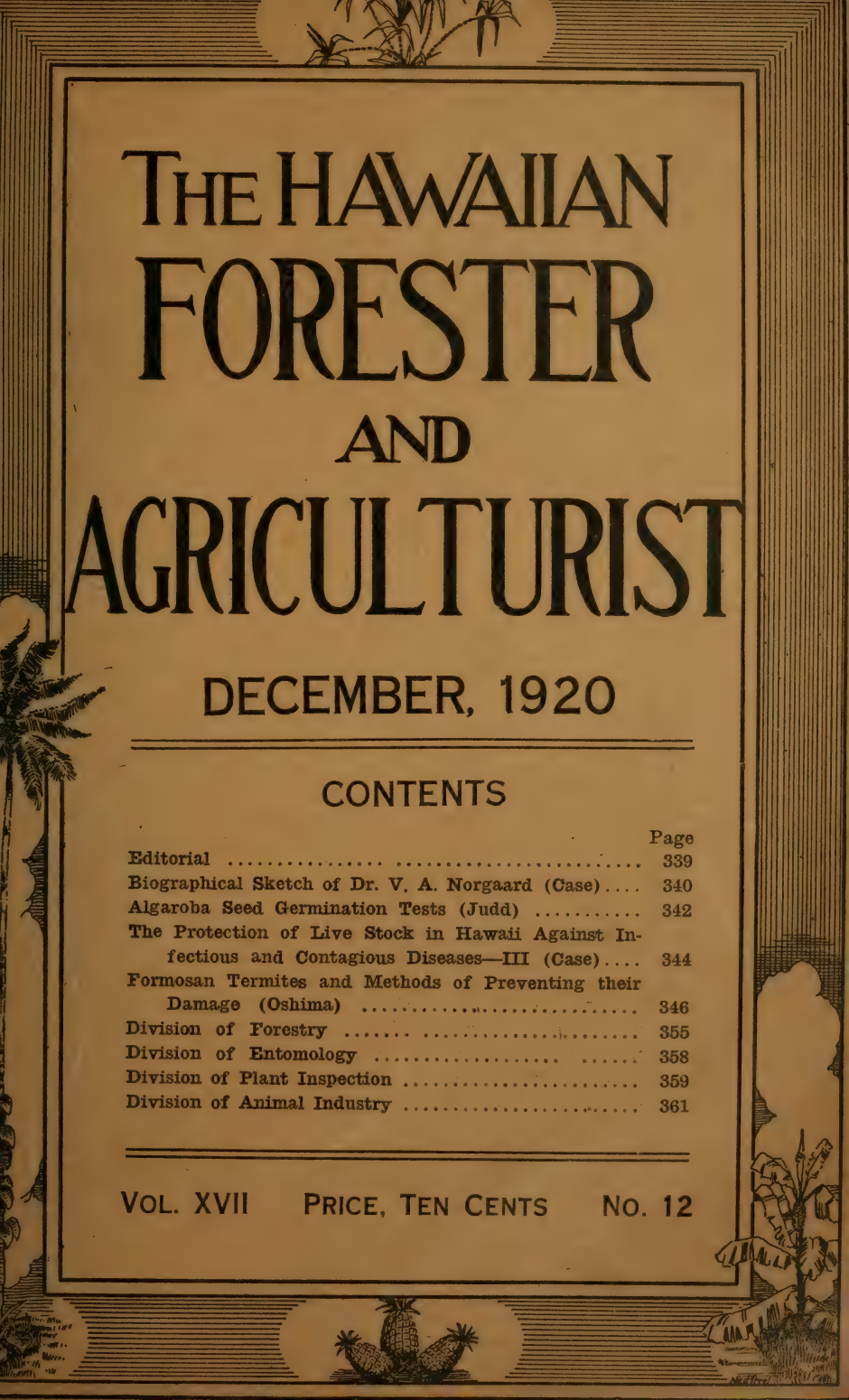
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# THE HAWAIIAN FORESTER AND AGRICULTURIST

DECEMBER, 1920

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VOL. XVII

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Superintendent of Forestry.

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To give information about insects free of charge is one of the duties of this Division, and Hawaiian readers are hereby invited to make inquiry in person and by mail. In order to be able to advise intelligently or send the right kind of useful insects for relief, we like and sometimes it is indispensable for us to see the insects suspected or caught in the act, also specimens of the injury. In a tin with a hole or two, or a wooden box, specimens may be mailed by parcels post. When specimens are not accompanied by letter, always write your name and address in the upper left-hand corner of the package. Address all communications, DIVISION OF ENTOMOLOGY, P. O. BOX 207, HONOLULU, HAWAII.

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Entomologist.

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# THE HAWAIIAN FORESTER AND AGRICULTURIST

VOL. XVII.

HONOLULU, DECEMBER, 1920.

No. 12

Dr. L. N. Case was on December 1, 1920, appointed Territorial Veterinarian to succeed the late Dr. V. A. Norgaard.

An article in this issue by the new Territorial Veterinarian on *hemorrhagic septicemia* will be found of value to breeders of cattle, hogs, and fowls.

The results of a test, conducted by the Superintendent of Forestry, of the germination of algaroba seed, when given different treatment before planting, are contained in an article in this issue.

With the seed of the Chaulmoogra oil tree received on November 27, from Mr. J. F. Rock from Siam, it is hoped to start sufficient trees to supply the local demand for the oil in this Territory.

The recent importation into the Territory of a large number of hogs for butchering purposes is a new departure, for during a number of years past the Territory has been able to supply the local demand for pork.

Mr. V. L. Ellis was on December 13, 1920, appointed Forest Ranger at Large for the Territory and has begun his duties in the Waianae District, Oahu, which will be concerned chiefly with forest protection work.

The second installment of an article on Formosan termites and methods of preventing the damage done by them is contained in this issue and will be found of interest to those in this Territory who are troubled by these destructive borers.

Arbor Day was celebrated this year on November 19, and a total of 6705 trees was distributed from government nurseries on the four main islands for planting on this day. At the Government Nursery 1732 school children of Honolulu called and were given one tree each.

The movement, started at the recent special session of the Legislature, to acquire 4000 additional acres of privately-owned land in the Kohala Mountains, Hawaii, is a step in the right direction of

reserving and protecting the forests on important watersheds and it is hoped that this project will be consummated before further inroads are made by cattle on the remaining forest in that region.

---

Mr. D. T. Fullaway, Entomologist of the Board, left Honolulu on Thursday, December 9, 1920, for Hong Kong and Calcutta where, for the purpose of introduction into the Territory, he will make a search for further parasites on the melon fly and for wasps which are responsible for the production of fertile seed on the trees belonging to the genus *Ficus*.

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It is with great regret that announcement is made of the death on November 15, 1920, of Dr. Victor A. Norgaard, Territorial Veterinarian, for the Board for a period of 15 years. At the Board meeting held on November 30, the following resolutions in appreciation of his services were adopted:

*"Resolved*, That in the death of Victor A. Norgaard, Territorial Veterinarian of the Board of Agriculture and Forestry, this Board and the Territory have lost a most capable and efficient officer who for a period of fifteen years by his able direction has not only greatly suppressed animal diseases found here and prevented new diseases from coming in, but also has caused great advancement in the principles of live stock breeding in this Territory.

*"Resolved*, further, that this Board in token of its appreciation of his valuable services cause this record to be made."

A biographical sketch of Dr. Norgaard appears in this issue.

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## BIOGRAPHICAL SKETCH OF DR. V. A. NORGAARD.

By DR. L. N. CASE, *Territorial Veterinarian*.

It is with deep regret that announcement is made of the death on November 15, 1920, of Dr. Victor A. Norgaard, Territorial Veterinarian in charge of the Division of Animal Industry of the Board of Agriculture and Forestry of the Territory of Hawaii.

Dr. Norgaard was born in Copenhagen, Denmark, on November 14, 1868. He was the son of Peter and Julie Norgaard and received his early education in the common schools of that country. At the early age of 18, he graduated with honors from the Veterinary High School of the University of Copenhagen, receiving the degree of V. S.

Realizing that the opportunities for advancement in the veterinary profession were greater in America than in his native land, he came to this country shortly after graduation and established himself in New York City, going from there to Lennox, Massachusetts, and finally to Madison, Wisconsin.



While at the last named place, experiments were started in the treatment of "lumpy jaw," *Actinomycosis* of cattle which early attracted the attention of prominent men is the U. S. Department of Agriculture with the result that he finally joined the staff of the Bureau of Animal Industry, then in its infancy.

As a Bureau inspector he was stationed at different times in all the larger packing establishments of the country. It was while stationed in Chicago with the packing firm of Nelson, Morris and Company that his early experiments with *Actinomycosis* in cattle were finally completed and the feasibility of a practical cure of the disease demonstrated.

These early experiments and the brilliant results attained issued in a career which few veterinarians have equaled.

From the Meat Inspection Division, Dr. Norgaard was transferred to the Division of Field Investigation and at one time or another was stationed by the Bureau in practically every state in the Union in the investigation, control and eradication of infectious diseases of live stock.

In 1891 the position of Chief of the Pathological Division of the Bureau was offered to him and he accepted it. He held this position for a period of ten years, resigning November 15, 1901, to become associated with the West Disinfecting Co., in New York City.

As Chief of the Pathological Division he started and conducted many original investigations in animal diseases and brought the Division up to a high standard of efficiency. As an author he published numerous pamphlets on infectious diseases of live stock which are considered standard works and which are frequently quoted. At this period he reached the pinnacle of his career establishing a monument to himself for all time through the manufacture and free distribution of Black-leg vaccine, thereby saving thousands of head of live stock and the owners hundreds of thousands of dollars. Millions of doses of this vaccine are yearly prepared by the Federal Bureau according to the original formula and distributed throughout the live stock sections of the country.

It was principally through the efforts of Mr. Jared G. Smith that Dr. Norgaard's services were obtained for the Territory of Hawaii in 1905. What he accomplished in the control and eradication of contagious and infectious diseases of live stock within this Territory and the prevention of their introduction from the outside world is a matter of record. It is certain that the Territory is safeguarded from outside contagion in a manner excelled nowhere in the world. The complete eradication of sheep scab and glanders has saved the Territory many thousands of dollars. The interest evinced in animal industry in general and the great advance in the principles of live stock breeding during the past fifteen years are due in large part to his untiring efforts and able direction.

A man of unusual ability and education in his chosen profession

he was also liberally educated in other lines and could converse with keen intelligence on almost any subject. Surrounding himself with the best in literature and art he had the ability ably to criticise both. Being more or less of a recluse and of a somewhat erratic temperament, he had few intimate friends, but those who knew him well appreciated the sterling qualities which he possessed.

In Dr. Norgaard's death the live stock industry of this Territory lost a sincere friend, an able adviser and director and the veterinary profession a brilliant member.

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## ALGAROBA SEED GERMINATION TESTS.

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By C. S. JUDD, *Superintendent of Forestry.*

One often comes across the statement that the seed of the algaroba (*Prosopis juliflora*) when eaten by stock is not crushed, but on passing through the alimentary system of the animal is rather prepared for quick germination by the action of the digestive fluids. To ascertain just what effect this process has on the germinating capacity of algaroba seed, a comparative test was undertaken at the Government Nursery in Honolulu, beginning in December, 1919, with the results given below.

The fruit of the algaroba, the most valuable lowland tree in the Hawaiian Islands, consists of a yellow pod about 6 inches long and half an inch wide, each pod containing about 20 seeds. Each seed is immediately surrounded by a crustaceous envelope which is enclosed in a thick spongy coat of sweet pulp. It is this sugary content which makes the pod relished by animals. So hard and tough is the protective parchment-like seed covering that in order to secure the clean seed it is necessary to cut out each with a sharp knife.

For this test six different sets of seed, of 100 each, were used and these were first treated in the following manner:

- No. 1. Naked seed, untreated.
- No. 2. Naked seed, placed in boiling water and soaked for 24 hours.
- No. 3. Seed in parchment covering, untreated.
- No. 4. Seed in parchment covering, placed in boiling water and soaked for 24 hours.
- No. 5. Naked seed, which had been passed through a horse by feeding the beans. Upon recovery the seed was removed from the parchment covering.
- No. 6. Seed in parchment covering which had passed through a horse.

After passing through the alimentary system it was found that

some of the parchment coverings had split open and the seeds had turned black and were somewhat swollen. Other parchment coverings had not been opened by the process and the seed was still light brown in color and only slightly swollen.

The seed was recovered from the horse on December 18, 1919, and the germinating tests were all started on December 20, 1919, by sowing the seeds in the usual seed boxes and giving them a light covering of soil. The test was continued for 119 days or until April 16, 1920, when the last seedlings appeared and the experiment was considered closed.

The resulting percentage of germination was as follows:

Seed Number.	Percentage of Germination.	No of days of last Germination.
1.	87	119
2.	86	16
3.	67	119
4.	58	47
5.	79	104
6.	57	119

From the above it will be seen that the naked untreated seed showed the highest percentage of germination or 87% and the seed in the parchment covering which had passed through the horse the lowest or 57%.

1. The germination of the naked untreated seed was spread rather consistently throughout the entire period of 119 days and only 21% germinated in the first 7 days.

2. All of the naked seed which received the hot water treatment germinated by the 16th day and 80% was up in the first seven days. This shows not only that the seed was not injured by the hot water treatment (when compared with the germination of the naked untreated seed, which serves as a check) but also that the germination was thereby very greatly accelerated.

3. The seed in parchment, untreated, showed consistent germination, after germination once began, but not a single seed sprouted until the 13th day when one seedling appeared and no more sprouted until the 26th day when a few began to come up and the general germination began. From this it is apparent that the tough parchment covering greatly delays germination.

4. The seed in parchment which received the hot water treatment did not produce the germination results that might have been expected. Germination, however, began on the sixth day and was consistent throughout the period, which lasted only until the 47th day, after which no more seed sprouted.

5. The seed which had passed through the alimentary system of the horse and had been removed from the parchment covering ranked third with a germination percent of 79. During the first seven days 32% germinated, showing for quickened germination a beneficial result of this treatment greater than the use of un-



treated naked seed but not as great as when the seed was soaked. Germination was consistent after this but diminished until the 104th day, after which no more seed sprouted.

6. The seed in parchment covering which had passed through the horse, which is the natural method by which algaroba seed is usually sown and spread over the country, gave the poorest results of all with a germination of only 57%. During the first seven days, only 12% germinated and the remainder sprouted consistently throughout the balance of the full 119 day period.

*Summary.* While the above test may not be considered extensive enough to be conclusive, it is sufficient at least to furnish the following preliminary deductions:

1. Algaroba seed is prepared for quick germination on passing through the alimentary system of a horse only when the seed is removed from the tough parchment-like covering.

2. Naked algaroba seed, untreated in any manner, gives the best germination results.

3. Placing naked seed in boiling water and soaking it for 24 hours does not injure the seed but greatly hastens germination.

4. The parchment-like seed covering greatly hinders germination.

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## THE PROTECTION OF LIVE STOCK IN HAWAII AGAINST INFECTIOUS AND CONTAGIOUS DISEASES—III.

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By DR. L. N. CASE, *Territorial Veterinarian.*

### HEMORRHAGIC SEPTICEMIA

This disease occurs in cattle, sheep, horses, swine and poultry and depends more or less exclusively upon infection with the hemorrhagic septicemia group of micro-organisms. In Europe, it also affects the stag, shuffle deer and roebuck. In the United States the disease appeared and was recognized by veterinarians in 1909 in six of the Eastern states and by 1910 had spread throughout the Middle West. In 1911 it threatened the extermination of the buffalo in Yellowstone Park but was checked by the perfecting, by the Federal Bureau of Animal Industry, of the method of vaccination which is now used throughout the United States wherever the disease occurs.

In this Territory this disease has been known in cattle since the early part of 1909 when a small outbreak occurred among cattle on the island of Hawaii and later the same year in cattle shipped to Honolulu stock yards from the Kona coast after particularly rough trips. Quite recently a number of cases have occurred among beef and dairy cattle on Maui, but it was not until the spring of this year (April-May, 1920), that the disease could be said to have assumed the character and spread of an epidemic,



when it appeared in the cattle of the Kau district of Hawaii with a mortality of two per cent among an aggregate of six thousand cattle belonging to various owners. This outbreak was promptly checked by vaccination.

As the micro-organisms causing this disease exist in the soil and normal air-passages of cattle and only upon certain conditions which tend to lower the vitality and powers of resistance of the animal do they assume a pathological significance, it would seem advisable that stock owners should be on the lookout for its appearance and especially that they should not hesitate to report an outbreak even if only a few animals are affected, and obtain such assistance and protection for their own and their neighbors' live stock as the Territory has provided for that purpose.

#### PATHOLOGY OF THE DISEASE IN CATTLE.

Hemorrhagic septicemia in cattle is an acute infectious disease which in the early stages of an outbreak often causes death in the course of a few hours. One or more dead animals may be found before the owner is aware of the presence of the disease in his herd or has noticed anything wrong with his animals, especially if the disease breaks out among cattle on the open range or in large pastures.

Post-mortem examination of an animal dead of hemorrhagic septicemia presents a strange appearance. Practically every organ in the body is affected. They look as if a bucket of blood had been thrown over them so closely are they covered with hemorrhages of varying sizes. Large masses of gelatinous material are found in both body cavities and all the lymph glands are swollen and drip blood when cut. The intestines may be filled with blood and their contents covered with bloody mucous. The lungs become the seat of gangrenous pneumonia, their appearance changing from the normal pink to a greenish color, and are more or less solidified and interspersed with streaks of a gelatinous nature.

The spleen, which is materially changed in appearance in anthrax, is rarely if ever affected in hemorrhagic septicemia and while there may be bloody discharges from the natural openings of the body they are different in character from anthrax and the blood retains its normal tendency to clot.

A disease as fatal as anthrax, it is more to be dreaded in that it may spring up at any time, while anthrax cannot occur except by direct "plant" or importation of animals affected or exposed to infection.

The Division of Animal Industry has on hand at the present time sufficient amounts of anti-hemorrhagic septicemia serum, vaccine and bacterin to take care of any outbreaks unless the disease should appear all over the Territory at the same time.

#### SWINE PLAGUE.

Swine plague, the hemorrhagic septicemia of hogs, has been observed in this Territory since 1909 and outbreaks of a more or

less serious nature have been reported from practically every island of the group.

While the post-mortem lesions do not show the same degree of severity as those in cattle they are, nevertheless, characteristic. Hemorrhages throughout the body are the rule, with the lungs principally affected in the uncomplicated type of the disease.

Straight swine plague, however, is rarely observed, the disease being complicated early in its course by secondary infections causing a necrotic enteritis. This double infection, known as Mixed Infection is the principal cause of loss among swine in this Territory. The same warnings to owners may apply in this disease as in hemorrhagic septicemia of cattle.

We have on hand at present an adequate supply of biologics to combat outbreaks of this disease.

#### FOWL CHOLERA.

Only one outbreak of hemorrhagic septicemia of poultry, or fowl cholera, as it is generally called, has come to notice but the virulence of the disease is amply demonstrated in that it exterminated 200 chickens in about 48 hours.

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### FORMOSAN TERMITES AND METHODS OF PREVENTING THEIR DAMAGE.

(Concluded\*)

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By MASAMITSU OSHIMA

#### TERMITE-PROOF BUILDING CONSTRUCTION

Serious damage to the Japanese buildings in Formosa is due to the Japanese timbers that are used as the principal building materials; namely, pine and cryptomeria. They are most liable to damage, because they contain a large amount of cellulose in comparison with other timbers.

When Japan occupied Formosa, Japanese architects had had no experience in regard to methods of preventing the damage caused by termites. Therefore, they erected buildings there just as in the mother country, paying no attention to the termite. This is another reason for the serious damage, for Japanese buildings are not suited to the Tropics. They rather attract the termite, since the foundation timbers are laid in contact with the ground.

From the point of view of economy, it is impossible to eliminate such nonresistant timbers from Japanese buildings. Therefore, a discovery of a new method of building construction, by which the attack of the termite can be absolutely prevented, becomes an important problem.

As a result of bitter experience during the last twenty years,

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\*Phil. Jour. Science XV, 4.

the method of constructing buildings and the treatment of nonresistant timbers have been greatly improved. As it is practically proved that the termite-proof building construction that has been recently adopted by the Government of Formosa is somewhat satisfactory, I, having been chiefly concerned with the investigation, wish to explain the method in detail.

*Disinfection of the ground.*—Not only is *Coptotermes formosanus* widely distributed throughout Formosa, but it occupies the whole ground densely; so that, as a first step in erecting a building, it is absolutely necessary, to destroy the pest, to keep the site free from the source of the damage. For this purpose, heavy oil of petroleum, creosote oil, or Termitol ( a mixture of heavy oil of petroleum and cresol) is sprinkled over the whole surface of the site, using 1 gallon (about 4 liters) of the fluid to 6 square feet (about 0.6 square meter) of area.

These fluids are nonvolatile at ordinary temperature and insoluble in water. They are effective for a long time, as they remain in the ground unchanged.

*Footings.*—To keep a wooden building free from termites, care should be taken not to use timbers in contact with the ground. To do this, it is necessary to use bricks and concrete in footings, even in the case of a wooden building.

*The termite-proof concrete layer.*—In order to prevent the entering of the termite, it is necessary to disconnect the upper parts of buildings from the soil. After the footings have been completed, a layer of cement concrete about 6 inches (about 15 centimeters) thick is spread over the whole area of the site at ground level, the edges being extended about 3 feet (about 1 meter) beyond the external walls of the building. Along the edges small drains are made, surrounding the whole concrete layer. Then the entire surface of the layer is covered with a thin stratum of cement mortar to fill up all the pores and cracks.

To reach the building, termites must either penetrate the concrete layer or cross the drains from the outside. It is proved, however, that cement concrete is quite safe against the attack of the termite, while lime concrete is not. Not only is the first method of attack almost impossible, but the second as well, for the drains are so constructed that they catch rain water from the eaves and thus prevent the intrusion of the pest. In the dry season the termite very often crosses the drains; but its covered tunnels can be found at once and it is readily driven out, because the outer parts of the concrete layer extend beyond the external wall and are used as sidewalks.

The aim of constructing a continuous layer of concrete above the ground level is to prevent absolutely the entering of the termite by means of an impermeable barrier. Great care should be taken, therefore, to keep the whole layer perfectly compact, and to avoid the occurrence of cracks and pores. To do so, the entire layer must be spread at the same time, in a continuous, even plane.



One of the practical difficulties of constructing a continuous concrete layer is that it stops construction of all other parts of the building until the concrete is entirely set. The concrete layer is divided into two or three parts, and each part is spread over the ground at a different time. After all the parts are joined together, the whole surface is covered with cement mortar. At a glance such a concrete layer seems as satisfactory as the ordinary layers. However, junctions between the sections are not tight enough to prevent the intrusion of the termites, and in many cases it was proved that the concrete layer had been penetrated by *Coptotermes formosanus* when it was ill-constructed; that is, with the layer divided into several parts.

Sometimes the architect is required to build the ground floor somewhat higher than the ground level. In such cases the concrete layer should be constructed, and the two layers on different levels connected by another vertical layer. This method is not advisable because of the presence of many junctions, which are liable to be passed through by the termite. If it is necessary to raise one part of the floor, it is better to make two concrete layers separately, instead of joining the two.

*First floor.*—Dark places with a proper quantity of moisture are most favorable for the habitation of *Coptotermes formosanus*. It is necessary, therefore, to provide ventilation holes and skylights for inclosed spaces, such as underparts of floors or inner parts of roofs.

In the case of storehouses or other special buildings the termite-proof concrete layer may be directly used as the first floor, but in ordinary houses the first floor should be raised about 3 feet (about 1 meter) above the concrete layer, by means of brick walls and brick supports. Two methods are adopted for constructing the first floor: the external parts of the building are entirely surrounded with brick walls about 3 feet (about 1 meter) high, which are provided with square ventilation holes, 2 by 1.2 feet (about 0.6 by 0.4 meter), situated 6 feet, (about 2 meters) apart; the floor rests upon square brick supporters; the floor is placed upon brick arches. Even in wood construction the present method is adopted, all woodwork being placed upon brick supports.

The advantages of this construction are as follows: None of the woodwork is in contact with the ground; the basement of the building is always kept dry and clean; the ample light makes inspection easy; and it is effective in keeping the building free from rats and mice, which are the propagators of the plague.

*Second floor; brick building.*—The second floor is constructed of reinforced concrete just like the concrete layer on the ground level, making a continuous plane. Its edges are extended to the external part of the walls, instead of being partially inserted into the brick walls. The upper and the lower surfaces of the layer are covered with cement mortar, and all the crevices, even



the holes made for gas and water pipes, etc., are carefully filled. Brick walls and partitions on the second floor should be absolutely disconnected from those of the lower floor in order to confine any damage to a limited area. In addition a number of ventilation holes or windows are made through the external walls to expose to the light the inclosed space between the second floor and the ceiling of the lower story.

*Second floor; wood construction.*—The distance between the beams of the second floor and the ceiling of the lower story is somewhat extended, and several ventilation holes or windows are made in the external walls to allow sufficient light to enter the interspace.

*Roofs.*—Both in brick and wooden buildings the inside of the roof is usually dark and contains a lot of timber, thus rendering it a favorable habitat for the termite. To get rid of this danger the interspace between the tiebeams and the ceiling is somewhat extended and several windows are made in the external walls.

*Brick walls.*—Care should be taken to prevent the entrance of the termite into brick walls, because it is difficult to destroy the insect, which lives in the voids between the bricks. In order to prevent its intrusion, the surface of brick walls should be entirely covered with cement mortar.

*Tiles.*—Two kinds of tiles are used for roofing Japanese houses; namely, ordinary tile and hanging tile. In laying the former, wet clay is used for bedding; the tiles are embedded in clay one by one and fixed to each other with lime mortar. Clay is never used with the other kind, the tiles being laid on the roof directly and fixed with pieces of wire. It is desirable to use the hanging tile only, for the layer of clay is occasionally used as an abode by the termites when they reach the roof.

*Timbers.*—All the timbers that are used in hidden places are treated with Termol, a special chemical made in the Camphor Bureau of the Government. Both immersion and impregnation are adopted for treating timbers.

*Mortar and concrete.*—It is strictly forbidden to use lime mortar and lime concrete, for lime is attacked by the termite. In constructing Government buildings, cement mortar and cement concrete only are used.

#### DEFECTS OF THE TERMITE-PROOF BUILDING CONSTRUCTION

It has been proved that if the concrete layer be kept in a sound condition—in other words, if there are neither cracks nor joints in the layer—the above-described method of construction is entirely satisfactory in preventing the intrusion of the termite from the ground. But there are many records in Formosa of theoretically well-constructed termite-proof buildings being infested by termites, notwithstanding the existence of a perfect concrete layer.

Is there any defect in the present termite-proof building construction, or is there some way by which termites can infest

buildings that is not controlled by means of the concrete layer? The answer to these questions is very simple.

As shown on a preceding page the mature males and females of *Coptotermes formosanus* leave the old nest in a swarm early in June. After separating into pairs, each couple establishes a new colony, raising a number of workers and soldiers. It is possible, therefore, that in the case of a building infested by the winged forms, the damage may be extended year after year, in spite of the existence of the termite-proof concrete layer.

The office of the Nippon Yusen Kaisha at Keelung, Formosa, which was built in 1915, is said to be a good example of the termite-proof construction. Nevertheless, in August, 1916, that is, only one year later, damage caused by termites was found on the second floor. At that time there was no damage on the first floor; there was no connection between the nests constructed on the second floor and the ground; the concrete layer on the ground level was perfect, having neither crack nor joint; many hyaline wings, which had been cast by the imagoes of *Coptotermes formosanus*, were found in the building; couples accompanied by young larvae were found in the brick walls, especially in wood bricks. Such being the case, there could be no doubt that the building had been infested by the winged form, which entered the house in the swarming season.

The concrete layer on the ground level may be strong enough to prevent the pest that starts from the ground, but it is of no use in preventing the intrusion of the winged forms. Certainly, in Formosa, the percentage of the damage to buildings has decreased since the new method of construction was adopted; but the present building construction is not absolutely termite proof, because it does not prevent the entrance of the winged forms.

#### TESTS OF THE RELATIVE RESISTANCE OF NATIVE AND EXOTIC WOODS

It is evident that the changes made in several parts of buildings in Formosa are more or less effective in preventing the damage by *Coptotermes formosanus*; but, since it is almost impossible to prevent the entrance of the winged forms, an investigation to discover other methods of prevention becomes necessary.

From an economic point of view it is hard to eliminate non-resistant timbers from building materials, especially in the case of Japanese buildings. Under such conditions the treatment of timbers so as to provide immunity from the attack of the termite is considered more important than the former method; because it is certain that the preventive measures, namely, constructing the concrete layer, etc., become unnecessary if the nature of timbers can be so changed that they are absolutely immune from the attack of the termite.

Certain species of wood are said to be naturally highly resistant to the termite. According to Thomas E. Snyder, forest entomologist of the United States Department of Agriculture, teak (*Tectona grandis*) from Siam and Burma, greenheart

(*Nectandra rodiae*) from South America and the West Indies, peroba (several species of *Aspidosperma*) from South America, and mahogany (*Swietenia mahogani*) from tropical America seem to be immune from the attack of the North American termites. Hagen also states that teak (*Tectona grandis*) and ironwood (*Sideroxylon*) of India are immune from attack by termites. George P. Ahern, formerly director of the Philippine Bureau of Forestry, states that the following woods are not subject to attack by the *anay*, a native Philippine termite: *Dinglas* (*Eugenia bracteata* Roxb. var. *roxburghii* Duthie), *ipil* (*Intsia bijuga* Gray), *molave* (*Vitex littoralis* Dene.), and *yacal* (*Hopea plagata* Vidal). In addition to these, *Cedrus deodard* from India, *Cedrus atlantica* from northern Africa, *Callitris glauca* (cypress pine) from Queensland, *Eucalyptus marginata* from Australia, and *Erythrophloeum lim* from Cochin China are reported to be immune from termite attack.

As a first step in the investigation it was necessary to prove whether these so-called immune timbers are really effective in preventing termite attack or not. To do this, forty-five species of native and exotic woods were selected and the test carried on as follows:

*Method of investigation.*—Each timber was cut into small blocks of definite size, 2 by 2 by 15 inches (about 5 by 5 by 38 centimeters); hundreds of these blocks were buried in the infested ground; different kinds of timbers were mingled, care being taken not to group the same species in one place; from time to time all the blocks were dug out for inspection, and after eliminating the infested ones the others were buried again.

*Locality of the experiment stations.*—Tainan, southern part of Formosa; and Matsubase, Kiushiu, Japan proper.

*Result of the test at Tainan.*—The ground was infested with *Odontotermes formosanus* (Shiraki), which is very common in the southern part of Formosa. The blocks were buried on November 17, 1912, and the final inspection was made on July 15, 1913.

*Result of the test at Matsubase.*—The ground was infested by *Coptotermes formosanus* Shiraki. The experiment station was selected in Japan proper as well as in Formosa, in order to test the effect under different conditions, especially the effect by a different species of termite. The blocks were buried on February 11, 1913, and the first inspection was made on October 8, 1913, after two hundred forty-nine days.

Although the duration of the experiment was nearly the same at Tainan as at Matsubase, the results obtained were slightly different. Thus, in the latter locality, kayil, palo maria, and malacmalac were more seriously attacked; lim, tallow wood, iron bark, grey gum, white mahogany, supa, betis, pagatpat, calantas, malugay, lanete, bansalaguin, lanutan, banuyo, and grey box were less seriously attacked; red narra, guijo, yellow narra, white stringy-bark, acle, amuguis, tukang-calao, tindalo,



batitanan, black butt, dungon, mancono, molave, and ipil, which have been attacked by *Odontotermes formosanus*, were immune. These differences seem to be due to the inactivity of the insect effected by somewhat lower temperature than in Formosa, as well as the existence of a smaller number of individuals. In order to get a more satisfactory result, the blocks that were found free from attack were buried again in the same place and left untouched until July 19, 1915.

Twenty-one months after first inspection, all the blocks were dug out.

These results agree quite well with those obtained at Tainan, although the Philippine woods molave and ipil have been slightly attacked by *Odontotermes formosanus*. It is a striking fact that teak and cypress pine, which are said to be absolutely immune from termites in the Tropics, are also free from the attack of two species of Formosan termites; namely, *Odontotermes formosanus* and *Coptotermes formosanus*. It seems reasonable, therefore, to conclude that teak and cypress pine are absolutely immune timbers.

The following paragraphs are quoted from Boulger:<sup>5</sup>

Cypress pine; *Callitris glauca* R. Br. (?); family Coniferae. Renowned for its pleasant odor—camphoraceous or sometimes reminding one of sandal-wood—and its great power of resistance to insect pests. Cypress pine is about the last timber that the white ant will attack. Some of the species, the red or black pine in particular, produce very showy timber; in fact, many of the plants are so gorgeous in appearance that care is required in using it for decorative purposes, lest it should have too overpowering an effect. At the same time much of the timber is of a quite, handsome character. The prevailing color of the figure is grown of various shades. It may be readily dressed to a smooth and glossy surface. It is extensively used in buildings liable to be attacked by white ants, for house blocks, linings, and ceilings of houses, and for telegraph poles. It is one of the most luxurious firewoods; it burns well, and in burning emits a delicious fragrance very generally admired. It is chiefly distributed in the drier parts of New South Wales, but some is available in the north coast district of Australia.

Teak; *Tectona grandis* L.; family Verbenaceae. It reaches a height of 80 to 100 feet, diameter 3 to 4 feet, sometimes larger. Trunk straight leaves large, drooping, and deciduous, simple and opposite, with a dense mat of velvety hairs beneath, varying in size from 19-33 centimeters long, and 13.5-22 centimeters wide, though sprout leaves are much larger.

Color of the timber is light straw-color to a brownish red, when fresh, but darkening on exposure. Some of the teak of the Decan is beautifully veined, streaked and mottled. Teak varies much according to locality and soil, that of Malabar being darker, heavier, and rather stronger, but not so large as that of Burma. Though without shakes on its outer surfaces, teak nearly always has a heartshake, which, owing to a twist in the growth, may often at the top be at right angles to what it is at the butt, thus seriously interfering with conversion, though often little affecting the use of the timber in bulk. In these shakes an excretion of apatite or phosphate of lime consolidates in white masses, which will turn the edge of most tools. Teak splits readily and is easily worked, but it owes its superiority for ship-building over both pine and oak in part to its freedom from any change of form or warping, when once seasoned, even under the extreme climatic

<sup>5</sup> Boulger, G. S., Wood.



variations. In India teak is used for railway sleepers, bridges, buildings and furnishings.

Teak is very fragrant when fresh and resembles rosewood, owing to an oleo-resin which also renders the wood probably the most durable of known timbers, making it obnoxious to termites and keeping off rust from iron in contact with it. Seasoned teak has, however, a very unpleasant smell, which has been compared to that of old shoe-leather. It is distributed in India, Burma, Siam, Ceylon, Java, Sumatra, and Celebes. In the Philippines small plantations occur in the southern islands, especially in Zamboanga district, Basilan Island.

#### RELATIONSHIP BETWEEN THE RESISTANCE AND THE PHYSICAL PROPERTIES OF TIMBER

It has been proved that some timbers are more highly resistant to termite attack than others; or, in other words, durability of timber seems to be effected by its physical or chemical properties. Determination of the factor of resistance is highly important in order to discover the preventive measures against termites. Therefore, the relation of the physical properties of timbers to the resistance is considered first.

Mancono and aranga, which are included in the group "very hard," are more seriously attacked than ipil, molave, and macaasim of the group "hard;" banuyo is less attacked than harder woods, such as palo maria, tindalo, etc.; calantas, a soft wood, is also less attacked than tucangcalao, amuguis, acle, etc.; which belong to the group "hard."

Ipil, molave, and macaasim, which are included in the group "heavy," are less attacked than very heavy mancono; that dungon, bansalaguin, batitinan, etc., are more seriously attacked than banuyo and palo maria of the group "moderately heavy;" and that amuguis, acle, guijo, etc., are also more seriously attacked than calantas, a light wood.

Thus the durability or resistance of timbers to the attack of termites is not effected by hardness or weight; that is, the immunity of timbers is not due to their physical properties.

#### RELATIONSHIP BETWEEN THE RESISTANCE AND THE CHEMICAL PROPERTIES OF TIMBER

Snyder<sup>7</sup> states that the immunity or relative resistance of ironwood is not due to hardness—since Asiatic termites attack the hardest wood, *lignum-vitæ*—but to the presence in the wood of a substance (oils or alkaloids) repellent or distasteful to termites. He also states that the presence of tyloses or of gums may be factors in determining the durability and resistance of hardwood species. It has been proved that the physical properties of woods are not the real factor of resistance as suggested by that author. However, another suggestion of Snyder, that the presence of certain chemical substances in woods is the true factor, is somewhat dubious. As he gives no data in detail, it is hard to understand what are the principal ingredients and how they act in preventing the damage.

<sup>7</sup> Bull. U. S. Bur. Ent. 94, (1916) 79, 80.

In order to determine the relationship between the resistance and the chemical properties of woods, I made the following investigation:

The quantity of ash and benzene extract in the above-mentioned woods was measured and compared with the percentage of damage obtained at Tainan.

*Sampling.*—A block of wood is cut along the three planes crossed at right angles, and the sawdust is collected. By the diagonal method reduction of the amount of the sample is made repeatedly, until about 20 grams of the sawdust are obtained. This sample is exposed for one hour in an air bath at 105° to 110° C. Then it is kept in a desiccator as a representative sample.

*Method of estimation of ash.*—A 1-gram sample is heated to redness in a platinum crucible over a Bunsen burner, and the incombustible substances are brought to a constant weight.

*Method of estimation of benzene extract.*—To estimate the benzene extract 5.00 grams of the sample are put into a Soxhlet apparatus and extracted with pure benzene for from six to ten hours. The benzene is driven off on a water bath, and afterwards the container is heated in an air bath at 120° C. to a constant weight. All determinations are made in duplicate.

It is evident that no special relationship exists between the resistance and the amount of ash and benzene extract. It is rather striking, however, that the percentage of benzene extract contained in cypress pine and teak, which are absolutely immune from the attack, is extraordinarily high.

## SUMMARY

1. In Formosa three species of termite, namely, *Leucotermes flaviceps* Oshima, *Coptotermes formosanus* Shiraki, and *Odontotermes formosanus* (Shiraki), are injurious to wooden structures.
2. A pair of mature individuals of *Coptotermes formosanus* is able to start a new colony.
3. In a newly established colony of *Coptotermes formosanus*, egg laying begins five to thirteen days after swarming.
4. *Coptotermes formosanus* lays from one to four eggs a day.
5. Eggs of *Coptotermes formosanus* hatch in from twenty-four to thirty-two days after they are laid.
6. The soldier of *Coptotermes formosanus* develops from the egg laid by the queen.
7. *Coptotermes formosanus* attacks lime mortar.
8. The principal food of *Coptotermes formosanus* is cellulose.
9. The termite-proof concrete layer is entirely satisfactory in preventing the entrance of termites from the ground.
10. Teak and cypress pine are absolutely immune from the attack of Formosan termites.
11. The resistance of timber is not due to its hardness or weight.
12. The resistance of timber is not due to the inorganic compounds contained in it.
13. The resistance of timber is due to organic compounds that can be extracted by benzene or alcohol.
14. Cypress pine contains "guajol," a sesquiterpene alcohol.

15. Foochow cedar and Randai cedar contain "cedrol," a sesquiterpene alcohol.
16. The resistance of timber is due to the presence of sesquiterpene alcohol.
17. Camphor green oil contains 25 per cent of sesquiterpene alcohol.
18. Camphor green oil is entirely satisfactory as a preventive for buildings.
19. The anthracene oil fractionated from coal tar is effective in preventing the damage of *Odontotermes formosanus*.

## DIVISION OF FORESTRY.

### REPORT OF SUPERINTENDENT OF FORESTRY, NOVEMBER, 1920.

Honolulu, December 9, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu, Hawaii.

Gentlemen:—I respectfully submit the following routine report of the Division of Forestry for the month of November, 1920:

#### TREE PLANTING.

During the month a total of 3,777 trees was set out as follows: On Tantalus on the Honolulu Watershed Reserve 407 koa trees were set out as replants in fail places and at Mikilua on the Lualualei Reserve there were planted out 877 red mahogany (*E. resinifera*), 797 Australian red cedar, 616 trees of a species of *Ficus* from Johore, India, 492 Cook pine (*Araucaria Cookii*), as well as 490 red mahogany and 98 koa replants.

Inspections were made of the Mikilua plantings on November 5 and 20, and it was found that in spite of dry weather the plantings on the whole are successful. Some of the eucalyptus species such as the bloodwood (*E. corymbosa*) and red gum (*E. rostrata*) are doing well where nothing else will succeed. During a dry season seedlings of the latter have made a height growth of 7 feet in five months.

Operations on the Waiahole Reserve, Oahu, were confined during the month to the weeding and cultivation of trees already planted and the digging of holes for new trees. The plantings were inspected on November 22, and it was found that practically all of the trees were doing well and showing good growth. The 550 kauri pine trees set out earlier in the year with a spacing of 10 by 10 feet are now 2 feet high and in a flourishing condition. The narra (*Pterocarpus indicus*) and molave (*Vitex parviflora*) from the Philippines are doing well and a few seedlings of the native bastard sandalwood, naio (*Myoporum sandwicensis*) are showing excellent growth.

At the request of Representative Norman K. Lyman a plan was drawn up and submitted to him for the establishment of a coconut grove at Kalapana Park, Puna, Hawaii.

On November 27, a package containing 7 lbs. of seed of the Chaulmoogra oil tree (*Hydnocarpus anthelminticus*) of Siam was received from Mr. Roek. A small quantity was sent to the nurseries on the other islands for propagation while the bulk was sown at the Government Nursery so as to produce seedlings for the establishment of this valuable tree on Oahu.

#### FOREST PROTECTION.

Ranger Harry L. Denison reports that there is no immediate need for the construction of the additional fence on the Waika-Kawaihae I boundary in the Kohala Mt. Forest Reserve, Hawaii, because the



present fence runs up to the Kehena ditch and cattle are not getting into the forest beyond this point.

On November 12, in company with the Assistant Superintendent, I inspected the government land of Waimano in the Ewa Forest Reserve. The whole forest on this land is in excellent condition and is serving well its function of conserving the runoff. Most of the reserve boundary across the land consists of natural barriers and although the old fence across the valley bottom was found to be out of repair there was no recent evidence of any cattle having entered the reserve. The necessary repairs will soon be made to this fence so as to prevent any possible damage by stock in the future.

During an inspection of the Hauula Reserve made on November 23, it was discovered that the gate on the fence line in the main valley was off its hinges and that in several places the wires were stretched apart allowing cattle to have access to the reserve. The gate was closed and temporary repairs made to the fence. On my return to town, I called to the Land Commissioner's attention the unsatisfactory conditions found at Hauula. The homesteaders there, by agreement with a former Land Commissioner, have the use of 193 acres of government land adjacent to the reserve as a free pasture on condition they keep the forest reserve fence in good repair. I have suggested to the Land Commissioner that he require the homesteaders to drive out their cattle and repair the fence within 30 days and thereafter to keep the fence in stock-proof condition.

An agreement has been made with the manager of the Haleakala Ranch whereby, at his suggestion, he will have his cowboys drive out of the Makawao Reserve, Maui, any stock found trespassing therein, the time of the men to be paid for by this Division. This should put a stop to the frequent trespass of tame cattle reported on that reserve. Additional trespass of tame cattle has been reported on the Waianae-kai Reserve, Oahu, and to remedy the situation there an additional ranger will soon be assigned to prevent this in the future.

Ranger Stone reports the completion on November 30, of a stretch of new fence 3,250 feet long built by the Hutchinson Plantation on the boundary of the Kau Forest Reserve, Hawaii, across the land of Kaalaiki, Kau, Hawaii.

#### ACQUISITION OF LAND.

In response to the Board's request that the title to 1,006 acres of privately owned land in the Kula Forest Reserve be acquired by the Territory, the Governor has replied that an exchange can not be made under the law if the area exceeds 40 acres in area, that there is not sufficient money in the fund for land purchases on Maui which could be used for this purpose, but that the matter will be presented at the next regular session of the Legislature.

During the month I have attended two meetings of the Agricultural Committee of the House of Representatives on the question of the acquisition of parts of the lands of Kehona 2, Kahualiilii, Kahunanii and Waika, amounting to 4,155 acres, which it is desired to include in the Kohala Mt. Forest Reserve, Hawaii. Condemnation proceedings for Kehona 2 were instituted in 1910 but were never consummated. At the request of the committee I shall accompany some of its members on an examination of the land, leaving Honolulu on December 8.

On November 20, Assistant Superintendent Kraebel went to Hawaii and began an examination of the lower line of the Hilo Forest Reserve. He was instructed to see what additional lands could be included in the reserve by bringing the line down further makai and to do the preliminary work necessary for the establishment of a permanent boundary and the construction of a stock-proof fence. This work is necessary before active steps can be taken to prevent further cattle trespass in this reserve.

Respectfully submitted,

C. S. JUDD,  
Superintendent of Forestry.



**REPORT OF THE FOREST NURSERYMAN, NOVEMBER, 1920.**

Honolulu, Hawaii, December 13, 1920.

Superintendent of Forestry, Honolulu, T. H.

Sir:—I herewith submit a report of the work done during the month of November:

**NURSERY.****Distribution of Plants:**

	Pot Grown.	In Transplant Boxes.	Total.
Sold .....	90		90
Gratis .....	753	950	1,703
Total .....	843	950	1,793

**COLLECTIONS.****Government Realizations:**

Collections on account of plants sold .....	\$ 2.00
Permit for hunting birds .....	1.00
Rent of office, Nursery Grounds, for October .....	\$35.00
Total .....	\$38.00

**Preservation Forest Reserves, Etc.**

Fee for camp site No. 27, Kokee Camp, Forest Reserve, Kauai (December 1 to December 31, 1920) .....	\$ 0.58
Animal Industry Revolving Fund:	
G. R. Campbell, Sept. Vaccine 155 doses @ 11c .....	\$25.05
T. J. Marantia, 125 doses M. T. Bact .....	15.00
T. J. Marantia, 20 lbs. Neero-bacillosis powder .....	2.60
Oahu Railway and Land Co. Ranch—	
23 pkgs. 2 cc Mixed Infect. Bacterin, Jen-Sal. ....	23.00
24 pkgs. Neero-bacillosis powder .....	15.60
W. H. Hayselden, 459 doses Hemorrhagic serum .....	50.49
1 bottle serum .....	2.50
H. E. King for vaccine .....	32.50
Treatment of dogs (5) .....	120.80
Total .....	\$287.54

**MAKIKI STATION.**

The work done at Makiki Station consisted of the regular routine—the mixing and sterilizing soil, transplanting and potting plants, etc.

**HONOLULU WATERSHED PLANTING.**

The principal work done consisted of clearing land around spring heads at top of Makiki Valley. Four hundred and seven koa trees were re-planted in places where others had died from drought and other causes.

**LUALUALEI RESERVE.****Trees planted during the month:**

Red mahogany, ( <i>Eucalyptus resinifera</i> ) .....	877
Johore ficus .....	616
Australian Red Cedar .....	797
Cook pine .....	492
Total .....	2,782

Trees replanted:		
Red mahogany, ( <i>Eucalyptus resinifera</i> )	.....	877
Koa	.....	98
Total	.....	588

#### ADVICE AND ASSISTANCE.

The writer has at the request of people in and around the city made the following number of calls and otherwise given advice and assistance:

Calls made	.....	6
Advice by phone	.....	8
Advice to people calling	.....	12

In addition to the following report on the distribution of trees for Arbor day, the regular distribution for the month is as follows:

Hawaii:

Plantation Companies, etc. .... 2086 in seed boxes

Maui:

Plantation Companies, etc. .... 1773 " " "

#### ARBOR DAY (November 19, 1920).

Oahu: Trees to the amount of 4,370 were distributed from the Government Nursery to people residing on the Island of Oahu, 944 trees being ordered by letter and 1,694 by people calling (6 schools ordered 122 trees included in the above list) while 1,732 children called in the afternoon of Arbor Day and received one tree each. The distribution of trees was not as large as in former years, but people who took advantage of receiving free trees seemed to be well pleased and very appreciative.

Hawaii: Brother Newell reports that he distributed for Arbor Day planting 1215 trees.

Maui: Mr. James Lindsay in his report states that he distributed 920 trees for Arbor Day.

Kauai: Mr. Joe Rita, Jr. reports that he distributed 200 trees for Arbor Day.

Summary:

Oahu	.....	4370
Hawaii	.....	1215
Maui	.....	920
Kauai	.....	200
Total	.....	6705

Very respectfully,

DAVID HAUGHS,  
Forest Nurseryman.

### DIVISION OF ENTOMOLOGY.

#### REPORT OF THE ENTOMOLOGIST, NOVEMBER, 1920.

Honolulu, Hawaii, December 9, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu, Hawaii.

Gentlemen:—During the month of November the insectary handled 17,100 pupae of the melon fly, from which were bred 2,983 females and 2,413 males *Opius fletcheri*.

The distribution of parasites was as follows:

## MELON FLY PARASITE.

*Opius fletcheri.*

Oahu:		Female	Male
Moiliili .....	700	700	
Kaneohe .....	200	200	
Metcalf St. ....	300	300	
Oahu Prison .....	300	300	
Nuuanu Avenue .....	250	250	

## FRUIT FLY PARASITES.

*Diachasma tryoni.*

Oahu:			
Kalihi Valley .....	400	400	
Maui:			
Paia .....	50	50	

*Diachasma fullawayi.*

Oahu:			
Kalihi Valley .....	400	400	
Maui:			
Paia .....	50	50	

*Diachasma giffardi.*

Oahu:			
Nuuanu Ave. ....			800

*Tetrastichus giffardianus.*

Oahu:			
Kalihi Valley .....			100

*Galesus silvestri.*

Oahu:			
Nuuanu Ave. ....			1200

## HORN FLY PARASITE.

*Spalangia cameroni.*

Oahu:			
Moanalua Dairy .....			1400

Respectfully submitted,

DAVID T. FULLAWAY,  
Entomologist.

## DIVISION OF PLANT INSPECTION.

## REPORT OF THE CHIEF PLANT INSPECTOR, NOVEMBER, 1920.

Honolulu, Hawaii, November 30, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—I respectfully submit my report of the work carried on by the Division of Plant Inspection for the month of November, 1920, as follows:

During the month 50 steamers arrived at the Port of Honolulu, 20 of which carried vegetable matter and 6 came through the Canal Zone. The following disposal was made of the various shipments:

Passed as free from pests....	1718 lots	36,182 pkgs.
Fumigated .....	20 "	20 "
Burned .....	63 "	63 "
Returned .....	1 "	1 "
<hr/>		<hr/>
Total inspected .....	1802	36,266

Of these shipments 35,869 packages arrived as freight, 237 as baggage and 160 as mail.

#### RICE AND BEAN SHIPMENTS.

During the month 34,229 bags of rice from Japan, 280 matts of rice from China and 1426 bags of beans from Japan arrived clean.

#### PESTS INTERCEPTED.

Approximately 5173 pieces of baggage belonging to immigrants from foreign countries were examined, from which 34 lots of fruit and 15 lots of vegetables were seized and destroyed.

On November 2 a package of roots from Japan and 2 packages of Betel nuts from Manila, all in the mail, were fumigated precautionary. A package containing lily bulbs, fern fronds, anemone roots, moss, chestnuts and yams was found in the baggage of a passenger. A large colony of *Prenolepis* sp. was found in the packing; all but the chestnuts and yams were destroyed which in turn were released after fumigation.

On November 5 a package of tree seeds from Mr. Kushi, North Queensland was found in the mail for Dr. Lyon and fumigated precautionary. In this package was a dead land shell for the Bishop Museum and some *Diptera* pupae (*Phoridae*) were in the shell. Evidently it was not thoroughly cleaned when packed. A package of dead butterflies from Mr. Kushi for the Bishop Museum were also fumigated precautionary. Two packages of tree seeds and a bag of large beans were found in the mail for Dr. Lyon from C. E. Pemberton, Suva, Fiji. In the latter, 2 lepidopterous larvae were found and all seeds were fumigated with carbonbisulphide.

On November 7 a package of tree seeds and a package of Palm seeds were found in the baggage of passengers from the Orient. These were destroyed. A package of tree seeds in the mail from Japan for Dr. Lyon was fumigated precautionary.

On November 17 a package of corn was taken from the baggage of an immigrant from Japan and destroyed. Fourteen packages of Chestnuts were also found in the baggage. Eleven were badly infested with moth larvae and weevils and were destroyed; the other three were fumigated precautionary and released. A bag of yams in the cargo from Japan was fumigated and later released, an ant colony (*Prenolepis* sp.) being found in the lot. The Oriental mail brought 5 packages of *Chaulmoogra* seed from Prof. Rock, Siam, for Dr. Lyon, also a package of Chestnuts from Japan. These were all fumigated precautionary.

On November 20 a package of Walnuts was taken from an immigrant from the Orient and destroyed.

#### HILO INSPECTION

Brother M. Newell, Inspector at Hilo, reports the arrival of 6 steamers at Hilo; 4 carried vegetable matter consisting of 195 lots and 3,590 parcels, all clean.

#### KAHULUI INSPECTION.

Mr. L. Gillin, Inspector at Kahului, reports 4 vessels arriving at Kahului; 2 carried vegetable matter consisting of 14 lots and 3,233 parcels, all clean.



### INTER ISLAND INSPECTION.

Fifty-seven steamers plying between Honolulu and other Island ports were attended and the following shipments passed:

Taro .....	221 bags
Vegetables .....	199 cases
Fruit .....	170 packages
Plants .....	106 packages
Pine Shoots .....	2520 bags
Seeds .....	4 packages

Total passed ..... 3220 packages

Twenty packages of plants, 5 packages of fruit and 1 package of sugar cane were rejected on account of infestation, undesirable soil and non-compliance with rules.

Respectfully submitted,

E. M. EHRHORN,  
Chief of Division.

### DIVISION OF ANIMAL INDUSTRY.

#### REPORT OF THE TERRITORIAL VETERINARIAN, NOVEMBER, 1920.

Honolulu, Hawaii, December 8, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu, Hawaii.

Gentlemen:—I have the honor to submit the following report for the month of November, 1920:

#### TUBERCULOSIS CONTROL.

Owing to the prolonged sickness of Mr. Richard the work in tuberculosis eradication was confined to the testing and examination of nine cows at the quarantine station, all of which passed the test.

#### ANTI-RABIC TREATMENTS.

During the past month five dogs have received the anti-rabic vaccinations and all are apparently doing well.

#### IMPORTATIONS OF LIVE STOCK.

During the past month 21 vessels were boarded and inspected, out of which number 9 were found to carry live stock for this port.

The following classes of live stock were represented:

Horses	Mules	Cattle	Dogs	Poultry	Swine
15	54	1	7	75	441

#### PROPOSED AMENDMENTS TO RULE VII—SWINE.

In view of the fact that large importations of butcher hogs will be arriving in the Territory from time to time from now on the following changes and additions to "Rule VII—Swine" of the present importation regulations are recommended.

**First**—Sec. 1, line 1, after the word “All” insert the words “pure-bred.”

Sec. 1, line 2, after the word “Hawaii” insert the words “for breeding purposes.”

Sec. 3, line 1, before the word “Swine” insert the words “pure-bred.”

**Second**—The addition of the following sections:

Sec. 4. Swine, other than pure-bred, shall be refused entry into the Territory unless accompanied by the certificates and affidavits as in Sections 1 and 2 described and shall be imported for the purposes of slaughter only.

“Sec. 5. Such swine shall be unloaded from the vessel into cars or drays and transported direct to the point of slaughter.

“Sec. 6. All such cars or drays shall be thoroughly cleaned and disinfected under the supervision of the Territorial Veterinarian before being allowed to return for reloading.

“Sec. 7. All expense connected with such cleaning and disinfection shall be borne by the owner or importer.”

It is therefore recommended that action be taken on the above amendments as soon as possible because of the fact that a large number of butcher hogs are now on the way from California and due to arrive in the next two or three days.

The shipment of hogs is for C. Q. Yee Hop & Co., who received the following cable on the 18th:

“Yee Hop:—Leaving today with hogs subject to two weeks quarantine.” (s) LOCEY.”

The wording of the above cablegram leaves little doubt that no attempt was made by the importer to secure certificates of health or affidavits as to the absence of infectious diseases of swine in the districts where purchased but that a direct attempt was made to take advantage of Sec. 3 of the present regulation, which section when written was intended to apply to pure-bred breeding stock only and not to be used as an excuse to import stock without the requisite health certificates.

The chances of introducing virulent strains of infectious diseases of swine in shipments of this character are great and we do not want any repetition of such importations as occurred in June of 1909 when hogs arrived here sick and dying of hog cholera and had to be transported miles through the city to the quarantine station.

Respectfully submitted,

LEONARD N. CASE,  
Territorial Veterinarian.

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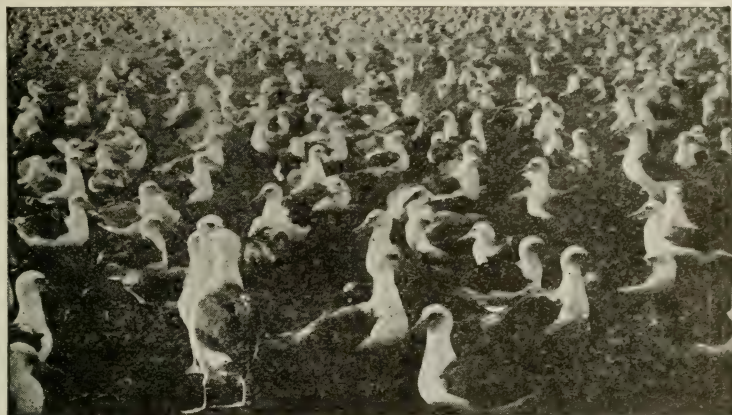
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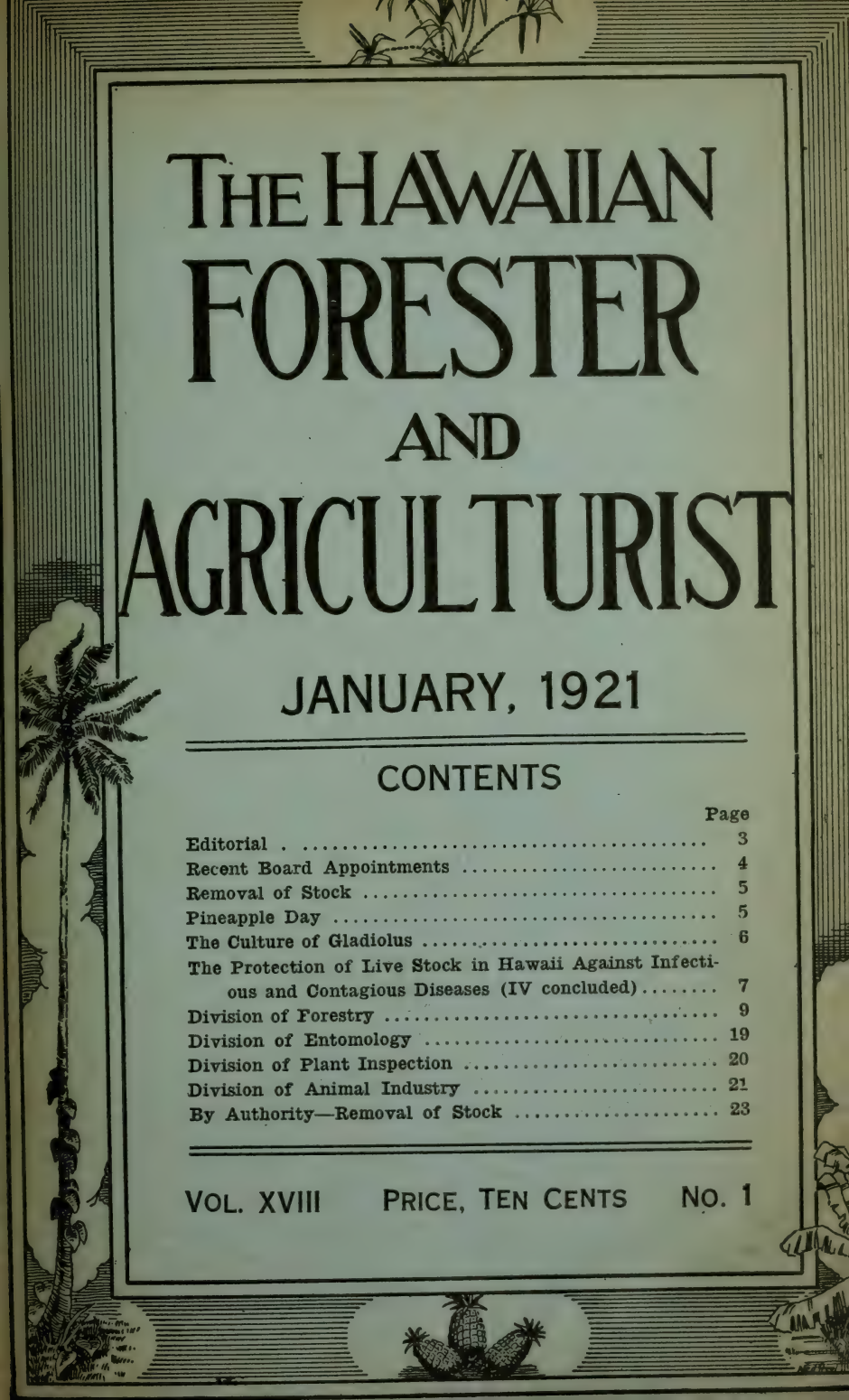
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# THE HAWAIIAN FORESTER AND AGRICULTURIST

JANUARY, 1921

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# Board of Agriculture and Forestry

## DIVISION OF FORESTRY.

### FOREST AND ORNAMENTAL TREE SEEDLINGS FOR SALE AT GOVERNMENT NURSERIES.

The Division of Forestry maintains the following nurseries on the several islands from which seedlings of the common forest and ornamental trees may be obtained at cost:

KALAHEO, KAUAI. Nursery at Papapaholahola Spring Reserve in charge of Joe Rita, Jr., Kalaheo.

Trees for planting on Windward Kauai may be obtained from the Kapaa School by applying to Mr. Geo. S. Raymond, Principal.

HONOLULU, OAHU. Government Nursery, King Street, in charge of Forest Nurseryman David Haughs, Box 207, Honolulu. Fresh tree seed may also be obtained from this nursery.

HAIKU, MAUI. Nursery in charge of Forest Ranger James Lindsay, Haiku.

HILO, HAWAII. Nursery at the Boys' Catholic School in charge of Bro. Matthias Newell, Hilo.

PRICES: Plants in seed boxes \$1.00 per 1000. Transplants in boxes 1c each. Transplants in pots 2½c each.

C. S. JUDD,  
Superintendent of Forestry.

## DIVISION OF ENTOMOLOGY.

To give information about insects free of charge is one of the duties of this Division, and Hawaiian readers are hereby invited to make inquiry in person and by mail. In order to be able to advise intelligently or send the right kind of useful insects for relief, we like and sometimes it is indispensable for us to see the insects suspected or caught in the act, also specimens of the injury. In a tin with a hole or two, or a wooden box, specimens may be mailed by parcels post. When specimens are not accompanied by letter, always write your name and address in the upper left-hand corner of the package. Address all communications, DIVISION OF ENTOMOLOGY, P. O. BOX 207, HONOLULU, HAWAII.

D. T. FULLAWAY,  
Entomologist.

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The Board of Commissioners issues for general distribution to persons in the Territory, annual reports, bulletins, circulars, copies of its rules and regulations, and other occasional papers, which may be had, free, upon application.

A complete list of the publications of the Board available for distribution (together with the titles of certain issues now out of print) is to be found on the cover of the last biennial report.

Applications for publications should be addressed to the Mailing Clerk, P. O. Box 207, Honolulu, Hawaii.

# THE HAWAIIAN FORESTER AND AGRICULTURIST

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VOL. XVIII.

HONOLULU, JANUARY, 1921.

No. 1

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The Board has granted permission to Mr. D. T. Fleming to bring into the Territory, for game purposes, doves from China and pheasants from Japan.

Contagious abortion in cattle, the last of a series of articles by the Territorial Veterinarian, is printed in this number.

A list of new appointments made by the Board during December, 1920, and January, 1921, is contained in this issue.

The question of protecting the native forests on government lands against the cutting of tree ferns for the manufacture of starch is dealt with in the Superintendent of Forestry's report in this issue.

One of the new trees added to the arboretum at the Manoa Ranger Station, Honolulu, during December, 1920, was the balsa tree (*Ochroma lagopus*), which produces wood which is lighter than cork.

Assistant Superintendent of Forestry Kraebel has made a good start in the project of enlarging and demarking the Hilo Forest Reserve on Hawaii, as will be seen by his reports printed in this number.

During December, 1920, the Division of Forestry planted out 4406 trees of nine different species on three separate reserves on Oahu. This is well above the average for the whole year, during which 38,775 trees were set out.

The chaulmoogra oil tree seeds imported from Siam by Mr. Rock are germinating well in the nursery, and the young plants will, before long, be ready to be set out in the plantation which will be established for the purpose of producing the oil for local use in curing leprosy.

Plans are being perfected for the removal of the animal quarantine station from its present location on Ala Moana, where it is becoming non grata, to a new and more suitable site. A portion of Sand Island, on the south side of Honolulu harbor, has been selected and the Governor has been furnished with a map and description of the area and has been requested to secure this site from the War Department for the new station.

MAR 17 1921

Dr. Cyril Golding, Deputy Territorial Veterinarian for Kauai, has been granted a month's leave of absence so as to attend the short course of veterinarians held at Davis, California, on January 3 to 8. Dr. Golding returned to Honolulu on January 25, and reports that the course was most instructive and that the exchange of ideas with the leading veterinarians whom he met will be of immense value to him in his veterinary work.

Entomologist D. T. Fullaway sailed for Hongkong and Calcutta on December 9, 1920, on a quest for beneficial insects preying on the melon fly and for wasps which are responsible for the production of fertile seed on trees of the genus *Ficus*. On January 15, 1920, a cable was received from him stating that he was making early shipments from Hongkong of the wasp which works on the Chinese banyan (*Ficus retusa*).

### RECENT BOARD APPOINTMENTS.

The following appointments have been made recently by the Board of Commissioners of Agriculture and Forestry:

*Dr. Leonard N. Case*, Territorial Veterinarian. December 1, 1920.

*V. L. Ellis*, Forest Ranger at Large. December 13, 1920.

*Dr. Lloyd E. Case*, Assistant Territorial Veterinarian, December 20, 1920.

*Henry D. Sloggett*, District Fire Warden, in and for that portion of the District of Puna, Kauai, south of and including the land of Wailua. December 17, 1920.

*Karsten Thot*, District Fire Warden, in and for that portion of the District of Koolauloa, Oahu, from the Waialua District line to and including the land of Kaunala. January 18, 1921.

*Frank Vaughan*, District Fire Warden, in and for that portion of the District of Koolaupoko, Oahu, extending from the Koolauloa District line to the land of Heeia. December 17, 1920.

*Frank Andrade*, District Fire Warden, in and for that portion of the District of Koolaupoko, Oahu, extending from and including the land of Heeia to the land of Kailua. December 17, 1920.

*Charles Lucas*, District Fire Warden, in and for that portion of the District of Kona, Oahu, extending from Makapuu Point to Palolo Valley. December 17, 1920.

*Jack Nairvi*, District Fire Warden, in and for Palolo Valley, District of Kona, Oahu. December 17, 1920.

*A. J. Watt*, District Fire Warden, in and for the District of Puna, Hawaii. December 17, 1920.

*Alexander C. Dowssett*, District Fire Warden, in and for that portion of the District of Kona, Hawaii, extending from the



land of Hookena to and including the land of Kaawaloa.  
December 17, 1920.

*Charles J. Krachel*, Deputy Fire Warden at Large, in and for  
the Territory of Hawaii. January 18, 1921.

## REMOVAL OF STOCK.

For the first time the Division of Forestry is taking advantage of the provisions of Act 65 of the Session Laws of 1919, by issuing a notice that after 60 days its agents will remove, shoot, or destroy, without compensation to the owner, the branded wild cattle found within the Makawao Forest Reserve, on the Island of Maui. Publication of this notice began in the Maui News on January 28, 1921.

For some time the Division has been engaged in ridding this reserve of the stock that has intentionally or otherwise been allowed to gain access to the reserve, and in co-operation with the Haleakala Ranch Company has been successful in eliminating all of the stock with the exception of two or three head which are so wild that they will not be driven out. The owners of the stock will have until April 2, 1921, to remove them from the reserve. After that date, the agents of the Division of Forestry will be free to remove or destroy them in any way they see fit.

The public notice appears on the By Authority page of this issue.

C. S. J.

## PINEAPPLE DAY.

The Hawaiian pineapple has been enjoyed by people in all parts of the world and this luscious fruit has done much toward putting Hawaii on the map. In recognition of this fact the Governor of Hawaii on January 27, 1921, issued a proclamation setting aside February 9, 1921, as Pineapple Day. Governor McCarthy's proclamation is as follows:

The Hawaiian pineapple is known all over the world for its quality and flavor. The only information that many people have of Hawaii is derived from the fact that the Islands pack very choice pineapples. The pineapple industry has taught many people of the mainland where Hawaii is situated.

The industry has made great strides in Hawaii during the quarter of a century just passed, having become second in importance in the Territory, and now employs more than 20,000 persons.

In recognition of the great benefit that the pineapple has been to these Islands, it seems appropriate that a special day should be set aside to accord it recognition.

Therefore, I, C. J. McCarthy, Governor of the Territory of Hawaii, do hereby proclaim Wednesday, February 9, 1921, as Pineapple Day, and ask

the people of Hawaii to take recognition of it in the schools, the homes and at public gatherings throughout the Islands.

Given under my hand and the Great Seal of the Territory, at the Capitol, in Honolulu, this twenty-seventh day of January, in the year of our Lord nineteen hundred and twenty-one.

(Signed) C. J. McCARTHY,  
Governor of Hawaii.

By the Governor:

(Signed) CURTIS P. IAUKEA,  
Secretary of Hawaii.

---

## THE CULTURE OF GLADIOLUS.

By E. M. EHRHORN, *Chief Plant Inspector.*

One of the few popular garden plants for cut-flower use in Hawaii is the gladiolus. From the fine specimens often seen in the flower stores it is strange that more people do not grow gladioli in their gardens. There are a great many new types and varieties now offered for sale on the mainland, and the bulbs are so easily propagated that every garden should have at least a few plants.

The gladiolus is a bulbous plant. It is propagated from a bulb which forms underground and roots like an onion. After developing its roots, foliage and flowers it produces above the old bulb a new bulb to which it transfers its functions of storing up in embryo the next year's roots, foliage, and flowers. The new bulb after ripening off is taken out of the ground and stored away in a cool place and is again planted as soon as the bulb shows life by the starting of a small sprout. Gladiolus bulbs vary greatly in size and shape, but are usually flat.

The culture of gladiolus in the garden is rather simple, for it thrives in all ordinary garden soils in sunny, airy locations. Deep, moist, sandy loam is the best. Stiff clayey soil should be avoided, but can be used by filling in spaces with sandy loam or leaf mould. Liberal applications of well-rotted manure should be dug in around the plants after they have made a good start. If a suitable bed for gladiolus can be prepared a month or so before planting the bulbs, so much the better, but the bed should be loosened up before planting. Bulbs should be planted from 2 to 4 inches deep, according to the condition of the soil; in light soils 4 inches deep, in heavy soils 2 inches deep, and from 4 to 6 inches apart. It takes from two to three months for the bulbs to flower, and those contemplating planting in groups or beds may plant the bulbs from 8 to 10 inches apart and then two weeks later new bulbs can be planted between the growing ones, thus prolonging the flowering period. If grown in rows they should be 12 inches apart. In dry weather the plants should be watered liberally, especially when the plants are developing their buds and flowers.

After the plants have finished blooming and are ready to be

taken up, great care should be exercised when removing the bulb not to lose the small bulblets, botanically known as cornels, as these if taken care of will soon produce flowering bulbs. These small bulblets can be placed in sand and kept for a few months and then planted in drills like peas in some good spots in the garden, where they will increase in size and flower in less than two years in our climate.

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## THE PROTECTION OF LIVESTOCK IN HAWAII AGAINST INFECTIOUS AND CONTAGIOUS DISEASES.—IV. (Concluded.)

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By DR. L. N. CASE, *Territorial Veterinarian.*

### CONTAGIOUS ABORTION.

This is a contagious disease principally of cattle, especially in breeding establishments such as dairies, although it may become widely spread among range animals, caused by the bacillus *Abortus* (Bang).

It is a disease which is attracting widespread interest among veterinary sanitarians and which probably causes more loss to the owner than any other infectious and contagious disease of cattle.

Existing on the mainland of the United States for many years, it was only recently discovered among the cattle of this Territory, although there is reason to believe that it has been present here for a considerable time among the dairy cattle in Oriental and Portuguese dairies and has never been reported.

Its introduction here undoubtedly occurred through the importing from the mainland of cattle known as "carriers"; that is, cattle which have aborted several times and finally recovered, but which are still able to spread the infection. It is impossible, at the present time, to guard against the introduction of such animals, as the authorities on the mainland are not in a position to issue agglutination test certificates to accompany shipments.

The disease is characterized by the expulsion of the uterine contents, followed by a uterine discharge, retention of the after-birth in many cases, though not always, and a more or less severe metritis. An animal may abort at any time during the gestation period from the second to the seventh month, with the majority of cases occurring during the fourth and fifth months. If uncomplicated with any other disease, the animal fully recovers. We have observed it here occurring with *hemorrhagic septicemia*, causing the death of the animal in each case.

The loss from this disease is confined principally to the death of the offspring, reduction in milk production, and the resulting sterility which, in many instances, follows a series of abortions.

Contagious abortion may persist for years in infected premises

when proper measures for its prevention and suppression are not taken. In the beginning, after the first case, new cases may not appear for several weeks; then, however, abortions begin to occur more rapidly until finally normal births occur only exceptionally. After a time the disease dies down, abortions occurring only rarely, the majority of the animals giving birth to full-time calves until a stage is reached where abortion occurs only in those animals which have been introduced from healthy herds.

After a herd has become infected, the separation of the apparently healthy animals which never have aborted, taking them to a place which is free from infection, is clearly indicated. If this cannot be accomplished, it is advisable to segregate the already infected and suspected animals in a separate stable or, if this is not possible, in isolated stalls in the same stable, and supply special attendants for them. Thorough disinfection of the entire premises should be practiced, burning all contaminated litter, remnants of feed, fetal membranes and afterbirths which may be in evidence.

It is the apparent establishment of an immunity in animals affected with contagious abortion which has been made the basis of the modern vaccine therapy in the control and eradication of this disease. At the present time two vaccines are on the market—one, a three-injection method, for the protection of the pregnant animal, the treatment to be finished before the fourth month of pregnancy; and the other, a single-injection method for the immunization of virgin heifers and non-pregnant cows. Sufficient work has not been done with them to establish definitely their value, but their use appears to be the logical line of treatment. It is, however, only in herds where complete breeding records are kept that the best results will be obtained through vaccination.

The Division of Animal Industry keeps on hand large amounts of both vaccines, which can be applied promptly where outbreaks are reported. It is recommended that the immunization of virgin and non-pregnant animals be practiced rather than the treatment of cows already in the gestation period.

Besides keeping on hand the biologics necessary in the treatment of the diseases so far enumerated, this Division has on hand supplies of canine distemper vaccines, equine influenza and *Hemorrhagic septicemia* vaccines, mixed bacterial vaccines for the treatment of wounds of various kinds, keratitis mixed bacterins for the treatment of pink eye in cattle and *Metritis* and *Mastitis* mixed bacterins, also for cattle. These vaccines can be supplied at short notice for use by the veterinarians connected with this Department.



## DIVISION OF FORESTRY.

REPORT OF THE SUPERINTENDENT OF FORESTRY,  
DECEMBER, 1920.

Honolulu, January 12, 1921.

Board of Commissioners of Agriculture and Forestry, Honolulu.

Gentlemen:—I respectfully submit the following routine report of the Division of Forestry for the month of December, 1920:

## TREE PLANTING.

During the month a total of 4406 trees was planted out on three different reserves on Oahu, as follows: On the Lualualei Reserve, at Mikilua, 876 red mahogany (*Eucalyptus resinifera*) and 57 replants, 723 Australian red cedar (*Cedrela australis*) and 50 replants, 1013 ironbark (*E. crebra*) and 43 replants, 741 *figus* from Johore, India, and 53 replants; total, 3556 trees. On the Waiahole Reserve, 50 kauri pine (*Agathis australis*), 50 Japanese cedar and 250 Australian red cedar; total, 350 trees. On the Pupukea Reserve, 91 *Ficus altissima*, 38 *Ficus retusa* var. *intida*, 88 Australian red cedar, and 283 koa; total, 500 trees.

Pupukea Tree Planting.—The latter planting was done under an agreement authorized by the Board on May 22, 1919, and entered into on April 7, 1920, with K. Harumi, whereby, for every acre in the reserve used for the cultivation of pineapples, trees are to be planted elsewhere on the reserve at the rate of 100 trees each year and on the area cultivated in pineapples as well and are to be cared for until 3 feet high. The number of trees to be planted the first year by the above agreement is 470, and the work has been completed. The quota for next year is 2750 trees.

The work of plowing land or making holes for trees under a similar agreement with F. S. Lyman on the same reserve is well under way, the planting sites having been selected by me on December 22. A total of 1330 trees are to be planted the first year, and these, which are now being shipped to Pupukea, consist of koa, mahogany and Australian red cedar and will be planted in January.

The quota to be planted the second year under this agreement is 1820 trees. In this manner all of the open spaces on the Pupukea Reserve will be reforested within the next seven years.

## TREES SENT OUT.

For additional planting on the Lualualei Reserve a supply of several thousand Australian red cedar, koa, silk oak, red mahogany and red gum trees was sent to Waianae on December 16. The planting at this place was inspected by me on December 14, and was found to be progressing well, with moisture conditions ideal for planting.

Trees in quantity, the first of a large amount to be supplied the Army, were sent to Schofield Barracks during the month for extensive planting on that reservation.

Forest Nurseryman Haughs returned on December 4 from an inspection trip to the Hilo Nursery and reports that the developments there are progressing favorably.

## CHAULMOOGRA OIL SEEDS GERMINATING.

The chaulmoogra oil tree seeds (*Hydnocarpus anthelminticus*) received from Mr. Rock from Siam and planted on November 29, 1920, began to

germinate on December 21, and are coming along nicely at the Government Nursery. I am informed by Dr. A. L. Dean that, while this is only one of the so-called chaulmoogra oil trees, its seeds contain the oil which is used in the cure for leprosy, and it is therefore a proper tree to plant for this purpose.

#### ALGAROA SEED TEST.

The results of a test, conducted earlier in the year, on the germination of seed of the algaroba or mesquite (*Proposis juliflora*) when given different treatment before sowing were written up and printed in a special article which appeared in the December, 1920, Hawaiian Forester and Agriculturist. A summary of the results obtained by the test is as follows:

1. Algaroba seed is prepared for quick germination on passing through the alimentary system of a horse only when the seed is removed from the tough parchment-like covering.

2. Naked algaroba seed, untreated in any manner, gives the best germination results.

3. Placing the naked seed in boiling water and soaking it for 24 hours does not injure the seed, but greatly hastens germination.

4. The parchment-like seed covering greatly hinders germination.

#### TREES PLANTED IN 1920.

On December 18, postal reply cards were sent out to all known tree planters throughout the Territory in order to obtain reports on the number and species of trees planted and the purpose of planting. These statistics will be used in the forthcoming biennial report, now in the course of preparation.

#### TREES FOR ARBORETUM.

A visit was made on December 28, to the Vineyard Street nursery of the H. S. P. A., with Dr. H. L. Lyon, who kindly let me make a selection of trees, which we did not have on hand, for planting in the new Makiki Arboretum and on the Manoa Ranger Station. The following trees were on December 30 added to the arboretum at the latter station: Aulu (*Sapindus Oahuensis*), Chaulmoogra oil tree (*Hydnocarpus anthelminticus*), Balsa (*Ochroma lagopus*), and kauri pine (*Agathis australis*).

#### MAKAPALA NURSERY.

On December 10, while on the trip to Kohala, I visited the H. S. P. A. tree nursery at Makapala, in the Kohala Mt. Forest Reserve, Hawaii, in company with Dr. Lyon and Ranger H. L. Denison. The stock on hand of 30,000 potted trees of various species, most of which were shipped up from Honolulu without soil around the roots, were in an excellent condition, and the force of nine men was busily engaged in planting out trees on private land in the reserve. The chief difficulty in reforestation here will be the struggle against Hilo grass, and the trees will have to be continually weeded before they are high and large enough to shade it out.

#### TREE MEASUREMENTS.

One day was spent with the Assistant Superintendent in taking measurements and making observations on trees planted in Manoa Valley three and four years ago, to determine the best species, of a large number, most suitable for extensive planting. The results of these observations will soon be made the subject of a special report.

#### FOREST PROTECTION.

On December 14 I took Ranger V. L. Ellis to Waianae and installed

him in the work of keeping stock out of the Waianae-kai Forest Reserve. During the month he has removed 11 head of stock from this reserve and with the aid of the tree-planting gang has strengthened the fences so as to prevent stock from crossing the boundary. From the Luaualei Reserve he has also assisted in removing 50 head of stock which wandered into the reserve. The fences here also are now being repaired.

Under the arrangement with the Haleakala Ranch, mentioned in my last report, two drives were made during the month in the Makawao Reserve, Maui, and it was found that almost all of the stock had been removed with the exception of 14 head which were driven out by the ranch hands. The manager reports that there now remain only two or three head, which are very wild, and I am taking up with him the advisability of removing them in accordance with Act 65, S. L. 1919.

#### TREE FERNS FOR STARCH.

An inquiry was made at this office during the month as to what attitude we would take on the subject of allowing the cutting of tree ferns on government lands in Olaa, Hawaii, for the purpose of manufacturing starch and also as to how much tree fern forest was available for this purpose. I have taken the stand that the cutting of tree ferns in the native forest is not compatible with proper forest protection, and attach herewith a copy of my letter of December 15, 1921, which sets forth my position more in detail.

#### TREE THINNING.

On December 11, in company with the City and County Engineer, I decided on certain thinnings to be made along the road to the Pali in Nuuanu Valley and subsequently marked the trees to be cut. The general plan followed was to remove suppressed and unsightly trees in certain places so as to let in more sunlight on the road, at the same time preserving the tunnel-like effect of trees over the highway and in other places to cut out complete stretches of trees so as to open up at advantageous points vistas of waterfalls, mountain scenery, and distant views. The work has been completed promptly by county labor, with satisfactory results.

#### WAIHAOLE LAND EXCHANGE.

On December 7, I visited, in company with the Land Commissioner and a member of the Land Board, the lands involved in the proposed exchange in the Waiahole Forest Reserve, Oahu, which was recommended to the Land Commissioner on March 18, 1920. The matter will come up at the next Land Board meeting on January 11, when it is hoped the exchange will be authorized, because I am very eager to complete the fencing so as to exclude stock from this important water-producing reserve and extend the tree planting to the open areas.

#### KULA RESERVE LAND EXCHANGE.

The Land Commissioner on December 27, 1920, informed me that he would have the 1006 acres of privately-owned land, within the boundaries of the Kula Forest Reserve, Maui, title to which it is desired to acquire so as to facilitate its administration, appraised so that an appropriation for the purchase of land may be requested of the Legislature at the next regular session.

#### KOHALA MT. RESERVE TRIP.

From December 8 to 11, I accompanied members of the Agricultural Committee of the House on a visit to the land of Kehena 2, in the

Kohala Mountains, Hawaii, which, with other lands amounting to a total of 4155 acres, it is desired to acquire and add to the forest reserve so that steps can be taken to prevent further damage by stock to the forest on this important watershed and to reforest the areas already denuded. Of the total area, it is estimated that only about 36% or 1500 acres are in need of artificial reforestation, and a plan has been prepared for accomplishing this at the rate of 250 acres per year for six years, providing the land is acquired and the necessary sum, which has been included in the new budget, is appropriated by the Legislature.

#### TIMBER TRESPASS, PUPUKEA.

While inspecting tree planting and forest conditions at Pupukea on December 22, I discovered and stopped the unauthorized cutting of some kukui trees by a Japanese in Paumalu Gulch within the Pupukea Reserve, Oahu, and left word for the "boss" to see me about it. He came in on December 31, and said that he was a new man in the region and that his wood-cutter in securing fuel wood for his own use did not know the boundary of the reserve and had cut over the line by mistake. I explained Rule II to him, that timber cutting was punishable by a heavy fine, and received \$5.00 from him for the five trees cut, as liquidated damages and not as penalty.

#### HILO FOREST RESERVE.

On December 21, Assistant Superintendent Kraebel returned from Hawaii, where he had spent about one month examining the makai line of the Hilo Forest Reserve for the purpose of establishing a new line along which a suitable fence can be constructed where needed. The result of his examination shows that approximately 2243 additional acres of government land and a net additional area of 18 acres of private land in forest, or which should be forested for proper water conservation, or a net total of 2261 acres, may well be included in the reserve by bringing the line further down the slopes of Mauna Kea in places, and that approximately  $4\frac{1}{2}$  miles of fencing will have to be built to protect the forest from stock where the new boundary crosses government land. This Division is working in close cooperation with the forestry division of the H. S. P. A. on this project. The next step is to survey the line and obtain a description, and a request has been made of the Territorial Surveyor to assign an assistant for this purpose as soon as available.

#### NEW WAIMANALO RESERVE.

The Territorial Surveyor has also been requested to survey and mark on the ground the mauka forested portions of the government land of Waimanalo and of the private land of Kailua with the view of creating a new reserve on these lands. The development of the "Waimanalo Pocket" will result in demands for a larger water supply, and it is important that the springs and streams on both of these lands be protected and increased by whatever forest protection is required.

#### NOTED VISITORS.

During the month I have received visits from George Meyers, a graduate of the first class of the Yale Forest School, who has visited forests in all parts of the world and who was much interested in the forest flora and the results of planting operations on the watershed back of Honolulu. It was a pleasure also to meet Dr. W. M. Doeters van Leeuwen, director of the botanical gardens at Buitenzorg, Java, who also was interested in everything he found here but remarked that we lacked the variety of species that is to be found in Java.

Respectfully submitted,

C. S. JUDD,  
Superintendent of Forestry.



(Copy.)

Honolulu, December 15, 1920.

Mr. J. M. Westgate, Agronomist in Charge, Hawaii Agricultural Experiment Station, Honolulu.

Dear Mr. Westgate:—In accordance with my recent promise, I beg to state that I have heard from Forest Ranger Mackenzie and he informs me that the ferns for the starch mill are being cut below the 18 Mile road in Olaa on land belonging to homesteaders.

So far as this office is concerned, I believe that the cutting of tree ferns for this purpose should be confined to such privately-owned lands, for upon mature deliberation I have come to the conclusion that the struggle of our native forest for existence is so difficult and the balance of nature so easily upset that it would be a very unwise practice to allow the removal of tree ferns on any of the government lands on which it is desired to retain the native forest.

I have lately seen inroads on the forest which have been followed with disastrous results, which have made me more than ever convinced that our native forest to be perpetuated must be left entirely alone and must not be interfered with either by man or beast.

For the above reasons I regret that, however desirable it may be to encourage the industry of making starch from tree ferns, I can not give my sanction to the cutting of any of such ferns on any government lands, whether under lease or otherwise, in the Olaa district. The Land Commissioner also informs me that he has not and will not give any such permission for the lands in the forest reserve under lease.

Very sincerely yours,

(Sgd.) C. S. JUDD,  
Superintendent of Forestry.

**REPORT OF THE ASSISTANT SUPERINTENDENT OF FORESTRY,  
NOVEMBER, 1920.**

Honolulu, December 10, 1920.

Mr. C. S. Judd, Superintendent of Forestry, Honolulu, T. H.

Dear Sir:—I beg to submit the following statement of my activities for the month of November, 1920:

The period from the first to the nineteenth, inclusive, was spent in the Honolulu office upon the compilation of an official forestry album of photographs taken in the various forest reserves and in an office study of conditions along the makai boundary of the Hilo Forest Reserve, on the Island of Hawaii. This study consisted in collecting upon a key map of the reserve all data available from the forestry files, from the office of the Land Commissioner, and the office of the Territorial Surveyor.

During this time also, two short field trips were made in company with the Superintendent of Forestry, one to inspect the Ewa Reserve boundary across the land of Waimano, Oahu, and the other to inspect the forest plantings below Kolekole Pass, in the Lualualei Reserve of the Waianae Range.

On November 20, I left Honolulu by steamer for Hilo, Hawaii, to inspect the makai boundary of the Hilo Forest Reserve. The purpose of this examination is to determine a preliminary re-location of the reserve boundary in order to include several tracts of unencumbered Government land, particularly homestead tracts which have proven undesirable for homestead purposes. Incidentally, the extent of grazing

trespass will be observed, and the amount and location of fencing required to stop such trespass. It is hoped that this entire makai boundary can be surveyed and properly monumented during next summer, so that the problem of cattle trespass can be more effectively dealt with.

Up to November 30th the boundary had been examined across the lands of Piihonua, Waiau, Puueo, Alae, and the Kaiwiki II homesteads. The area mauka of the Kaupakuea and Honomu homesteads, and the south half of the Kaiwiki III homesteads, were also examined. In a remote clearing in the forest in Lot 67 of the Kaiwiki II tract, a Portuguese family containing nine small children was found living in a condition of insanitation which ought not to be permitted on any Government homestead.

A more detailed statement of the boundary examination will be submitted upon completion of the work.

Respectfully submitted,

CHARLES J. KRAEBEL,  
Assistant Superintendent of Forestry.

# **REPORT OF THE ASSISTANT SUPERINTENDENT OF FORESTRY, DECEMBER, 1920.**

Honolulu, January 4, 1921.

Mr. C. S. Judd, Superintendent of Forestry, Honolulu, T. H.

Dear Sir:—The following routine report of my work done during the month of December, 1920, is respectfully submitted:

During the first twenty days of the month I continued and completed the inspection of the makai boundary of the Hilo Forest Reserve, on the Island of Hawaii. This work, although considerably retarded by bad weather, was greatly facilitated by the generous cooperation of the plantation managers in supplying saddle horses and guides familiar with the difficult border country between the forest and the cane fields.

On December 10, in company with the President of the Board of Agriculture and Forestry and various public officials of Hilo, a visit was made to the Wailoa River Park tract, which it is proposed to place under the jurisdiction of the Board for development by the Division of Forestry as an arboretum. Later I made a more intensive examination of this area to determine its suitability for arboretum purposes. The results of this examination are set forth in a separate memorandum.

On December 11, in company with Mr. Atkinson and Ranger MacKenzie, I visited the Olaa Ranger Station on the volcano road. The building is now complete, but requires some further additions of furniture and utensils to be ready for occupancy.

While in Hilo I visited the office of Doty & Co., manufacturers of tree-fern starch. This company is at present getting its supply of fern logs from homestead lands and has under way negotiations for the ferns on a considerable tract of other private land which will supply its plant for a long time. In collaboration with the U. S. Experiment Station, experiments will be started in growing tree-ferns from the unused tops of the trees in order to assure a future supply from private lands. From our present knowledge of the importance of tree-ferns in the economy of our native forests, it does not appear expedient ever to permit the cutting of these ferns within the forest reserves.

On December 21, I returned to Honolulu, where several days were spent on office work relating to the Hilo Reserve project. Two short field trips were made with the Superintendent of Forestry, one to inspect the co-operative tree-planting within the Pupukeya Forest Reserve, and the other to examine the exotic tree plantations in upper Manoa Valley.

## HILO FOREST RESERVE BOUNDARY.

With regard to the Hilo Reserve boundary, conditions in general were found to be quite satisfactory insofar as the growth of the forest along the boundary is concerned. A considerable mileage of private fence in good repair was found, but at the same time evidences of cattle trespass were numerous. The amount of fence to be built by the Division of Forestry across government land is estimated at 4.7 miles. Since most of this fencing will be required as a result of changes in the boundary, it is possible that this figure may be increased after a more intensive examination.

The boundary changes suggested as departures from the description in the Acting Governor's proclamation of July 24, 1904, are as follows:

COURSE 4 to be brought makai about 3000 feet on approximately its present bearing between Hookelekele and Awehi Streams. The government land in Piuhonua and Waiau to be thus included in the reserve comprises 615 acres, more or less, upon which sugar cane culture has been found unprofitable and has long ago been abandoned.

COURSES 5 AND 6 to be changed to eliminate from the reserve about 160 acres of the private land of Puueo now used by the Hilo Sugar Company in developing a small dairy.

COURSE 8 across the top of Kaiwiki II to be brought makai to run between Lots 70 and 71, thus including in the reserve the three lots, 71, 72, 73, totaling 141.2 acres, which have never been applied for. These lots are very remote from settlements and are covered with dense forests, as are all the Kaiwiki II lots mauka of No. 60.

COURSE 15 to be changed to include unencumbered government lands about Puu Kauku, approximately 80 acres.

COURSE 16 to be brought makai a varying distance to include eleven untaken homestead lots (540 acres) of Kaiwiki III and three (131 acres) of Opea-Peleau, two unencumbered government areas in Kaiwiki and Kamaee, and some private land in Hakalaunui and Umauma.

COURSE 19 to be brought down to follow the makai boundaries of untaken Waikaumalo lots 67, 68, 69, and 70 (400 acres), thus shortening Course 18 and eliminating Course 20.

COURSES 26-27 to be moved mauka about 3000 feet to eliminate land used as pasture by Manuel P. Silva under agreement with the Laupahoe Sugar Company, owners.

COURSES 28-29 to be changed slightly to correct an error in the Kahoahuna homestead lots 12 and 13.

All of these proposed changes are indicated on a white-print map (March, 1919) of the Hilo Forest Reserve on file in this office. The estimated acreage affected by these alterations of the boundary is as follows:

Government land to be included in the reserve.....	2243 acres
Private land to be included .....	370 "
Private land to be eliminated .....	352 "
Net increase in area .....	2261 "

The following recommendations with regard to the Hilo Forest Reserve are offered:

1. That the makai boundary be completely surveyed, marked on the ground, and monumented during the early summer of 1921.
2. That, coincident with the survey, a trail be blazed following as

closely as possible the line of survey, this trail to be developed as opportunity offers and maintained wherever necessary for purposes of patrol.

3. That a forest ranger of the highest type procurable be appointed exclusively for the Hilo Reserve. It is very desirable that he be appointed before the survey is made, and that he work with the survey party over the entire line.
4. That the sugar plantations adjacent to the reserve be encouraged to plant forest trees upon all the border glasslands between the existing forest and the upper limit of cane culture which is not absolutely not needed for pasture, such planted woodlots to be managed ultimately as a permanent source of supply of firewood and posts for the plantations. The shortage of these materials will soon be serious on several plantations in this district, and now is the time for action to forestall hardship. At the same time such forests will constitute a much-needed barrier fringe to prevent that gradual recession of the native forest which is the subject of so much conjecture, but which undoubtedly has as one of its chief causes direct exposure to the clearings, with all the attendant evils of wind and drought. In this connection, not only should our nursery at Hilo prepare to supply a variety of trees in quantity to the planters, but positive efforts should be made to move the managers to immediate action in the matter, and intimate cooperation should be offered them in starting the woodlots.
5. That a meeting of the plantation managers concerned be held at Hilo in the near future for the purpose of discussing the whole matter of the Hilo Reserve boundary before the survey is begun.

Respectfully submitted,

CHARLES J. KRAEBEL,  
Assistant Superintendent of Forestry.

# **REPORT OF THE FOREST NURSERYMAN, DECEMBER, 1920.**

January 13, 1921.

Superintendent of Forestry, Honolulu, T. H.

Dear Sir:—I herewith submit a report of work done during December:

## **NURSERY.**

### **Distribution of Plants.**

The distribution of plants from the Government Nursery amounted to 7381, as follows:

Sold .....	270
Gratis—military posts .....	3605
Forest reserves .....	3362
Miscellaneous .....	144

## **COLLECTIONS.**

### **Government Realizations.**

Collections on account of plants sold.....	\$ 3.40
Plants sold by J. Rita, Jr., Kalaheo Nursery .....	23.00
Rent of office, Nursery Grounds, for November.....	35.00

\$61.40



### Preservation, Etc., Forest Reserves.

#### Rents and Fees:

Minota—Rent of premises at Half-way House, Tantalus, for quarter ending December 31, 1920 .....	\$ 30.00
Lizzie Tong Wai—Fee for use of land and gathering ti leaf, Kalawahine, Pauoa Valley, for quarter ending December 31, 1920 .....	12.50

#### Black Sand:

232 loads of black sand @ 50c per load taken from Makiki Valley Sand Pit for quarter ending December 31, 1920.....	116.00
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#### Kokee Camps, Kauai:

Frank Crawford, camp site No. 34, Kokee Camps, January 1st, 1921, to December 31st, 1921 .....	8.00
	<hr/> \$166.50

### Animal Industry Revolving Fund.

December 21—Dr. Colville, rabies treatment for dog.....	\$ 6.00
E. C. Peters, rabies treatment for dog.....	12.00
W. Loomis, rabies treatment for dog .....	6.00
Sam Kauhani, rabies treatment for dog.....	27.38
	<hr/> \$51.38

### MAKIKI-STATION.

The road leading to this station has been damaged by the heavy rains of late and we shall have to use some of the men from the watershed to assist in repairing it. Other work done has been the regular routine.

### HONOLULU WATERSHED.

The work done on the watershed has been principally repairing and extending trails, clearing off and making holes for trees. We shall start planting again during January.

### SUB-NURSERIES.

**Hawaii:** The sub-nursery at Hilo, in charge of Brother M. Newell, distributed the following trees during December:

Silk oak.....	362	in	transplant	boxes
Japanese cedar.....	176	"	"	"
African tulip tree.....	48	"	"	"
Miscellaneous.....	28	"	tins	
Total.....	614			

**Maui and Molokai:** Mr. James Lindsay, in charge of the Haiku nursery, Maui, in his report for the month of December, states that he distributed 1907 trees in transplant boxes and 43 in tins—total, 1950—comprising ten species of forest and shade trees.

**Kauai:** Mr. Joe Rita, Jr., in charge of the nursery at Kalaheo, reports that he distributed 321 trees of the following species: *Eucalyptus robusta*, *E. citriodora*, *E. resinifera*, *Casuarina equisetifolia* (Ironwood).

### TREE PLANTING ON FOREST RESERVES, OAHU.

**Lualualei:** Mr. J. K. Luka reports the following trees planted during December:

<i>Ficus</i> sp. (Johore) .....	741
<i>Eucalyptus resinifera</i> .....	876
<i>Eucalyptus crebra</i> .....	723
Australian Red Cedar .....	1013
Total.....	3353
Replanted where others have died .....	203

**Waiahole Reserve:** The following trees were planted by Mr. Rocha:

Kauri Pine .....	50	pot	grown
Japanese Cedar .....	50	"	"
Australian Red Cedar .....	250	"	"
Total.....	350		

**Pupukea Reserve:** Planted by K. Harumi:

<i>Ficus altissima</i> .....	91
<i>Ficus retusa</i> var. <i>intida</i> .....	38
<i>Acacia koa</i> .....	283
Australian Red Cedar .....	88
	500

#### TRIP TO HILO.

The writer made a trip to Hilo for the purpose of examining and giving advice in the starting of the new nursery at the Animal Quarantine Station, leaving Honolulu on December 1 and returning on December 4. The work of starting the new nursery is progressing very satisfactorily. Dr. Elliot has done good work in attending to the building of office and potting shed, etc., also leveling and clearing the ground. The building of tables and stands for plants in boxes and pots is also started, and the removal of the equipment from the Hilo Catholic School is commenced. In a short time the nursery will be in proper working order.

#### ADVICE AND ASSISTANCE.

The writer has made the following number of visits and otherwise given advice and assistance as follows, at the request of people in and around the city:

Visits made .....	10
Advice by telephone .....	8
Advice given people calling .....	6

Respectfully submitted,

DAVID HAUGHS,  
Forest Nurseryman.

## DIVISION OF ENTOMOLOGY.

## REPORT OF THE ACTING ENTOMOLOGIST, DECEMBER, 1920.

Honolulu, January 12, 1921.

Board of Commissioners of Agriculture and Forestry, Honolulu, Hawaii.

Gentlemen:—During the month of December the insectary handled 20,500 pupae of the melon fly, from which there were bred 3762 females and 2905 males, *Opinus fletcheri*.

The distribution of parasites was as follows:

## MELON FLY PARASITES.

		Females.	Males.
	<i>Opinus fletcheri</i> .		
Oahu:	Nuuanu Avenue .....	600	550
	Kalakaua Avenue .....	600	600
	Moiliili .....	550	500
	Moanalua .....	350	200
	Oahu Prison .....	150	150

## FRUIT FLY PARASITES.

*Galesus silvestri*.

Oahu: Wyllie Street ..... 1300

*Dirhinus giffardi*.

Oahu: Wyllie Street ..... 1000

*Diachasma tryoni*.

Oahu: Wyllie Street ..... 150      150

*Diachasma fullawayi*.

Oahu: Wyllie Street ..... 100      100

*Tetrastichus giffardianus*.

Oahu: Wyllie Street ..... 700

## CORN LEAF-HOPPER PARASITE.

*Paranagrus osborni*.

Oahu: Honolulu ..... 1500

The entomologist left Honolulu on December 9, 1920, for Hongkong and Calcutta on a quest for beneficial insects preying on the melon fly and for wasps which are responsible for the production of fertile seed on trees of the genus *Ficus*.

Respectfully submitted,

E. M. EHRHORN,  
Acting Entomologist.

## DIVISION OF PLANT INSPECTION.

## REPORT OF THE CHIEF PLANT INSPECTOR, DECEMBER, 1920.

Honolulu, December 31, 1920.

Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—I respectfully submit my report of the work carried on by the Division of Plant Inspection for the month of December, 1920, as follows:

During the month 47 vessels arrived at the port of Honolulu, 22 of which carried vegetable matter and seven came through the Canal Zone. The following disposal was made of the various shipments:

Passed as free from pests...	1678 lots	32,799 pkgs.
Fumigated.....	17 “	17 “
Burned.....	93 “	93 “
Returned.....	4 “	15 “
Total inspected.....	1792 “	32,924 “

Of these shipments, 32,512 packages arrived as freight, 277 as baggage, and 135 as mail.

## RICE AND BEAN SHIPMENTS.

During the month 28,535 bags of rice from Japan, 170 matts of rice from China, and 3199 bags of beans from Japan arrived and were passed.

## PESTS INTERCEPTED.

Approximately 1429 pieces of baggage belonging to immigrants from foreign countries were examined, from which 72 lots of fruit and 15 lots of vegetables were seized and destroyed. A tabulated list of material intercepted, other than the above-mentioned fruits and vegetables, follows:

From Suva, Fiji:

December 11—1 pkg. seeds, mail, fumigated precautionarily.

From Japan:

December 13—2 pkgs. chestnuts, baggage, burned, weevils. (Badly infested).

1 pkg. plant, baggage, burned, prohibited.

1 pkg. rice paddy, baggage, burned, prohibited.

1 pkg. oranges, mail, burned, prohibited.

12 bags rice paddy, cargo, returned, prohibited.

2 bags lotus seed, cargo, fumigated, weevils.

1 basket lily bulbs, cargo, fumigated, plant bugs and ants.

December 21—1 basket lily bulbs, cargo, fumigated, plant lice.

December 22—1 pkg. plant, baggage, burned, prohibited.

From Philippine Islands:

December 8—2 pkgs. betel nuts, mail, fumigated, precautionarily.

1 pkg. rice paddy, mail, burned, prohibited.



From Siam:

December 21—10 pkgs. tree seeds, mail, fumigated, weevils.  
1 pkg. plant cuttings, mail, burned, arrived dead.

From Vermont (continental United States):

December 21— 1 Conifer, mail, burned, prohibited.

#### HILO INSPECTION.

Brother M. Newell, inspector at Hilo, reports the arrival of six vessels at Hilo. Four carried vegetable matter, consisting of 153 lots and 4309 parcels, all clean. 570 bags of rice and 546 bags of beans arrived from Japan and were passed.

#### KAHULUI INSPECTION.

Mr. L. Gillin, inspector at Kahului, reports eight vessels arriving at Kahului. Two carried vegetable matter, consisting of 16 lots and 2246 parcels, all clean.

#### INTER-ISLAND INSPECTION.

Fifty-three vessels plying between Honolulu and other Island ports were attended and the following shipments passed:

Taro.....	221 bags
Vegetables.....	199 cases
Fruit.....	207 packages
Plants.....	70 "
Pineapple Shoots .....	10,658 bags
Sugar Cane.....	1 pkg.

Total passed..... 11,356 packages

Seventeen packages of plants and one package of sugar cane were rejected on account of infestation, undesirable soil and non-compliance with the regulations.

Respectfully submitted,

E. M. EHRHORN,  
Chief of Division.

### DIVISION OF ANIMAL INDUSTRY.

#### REPORT OF THE TERRITORIAL VETERINARIAN, DECEMBER, 1920.

Honolulu, January 12, 1921.

Board of Commissioners of Agriculture and Forestry, Honolulu, Hawaii.

Gentlemen:—I beg to submit the following report for the month of December, 1920:

#### TUBERCULOSIS CONTROL.

The following dairies were tested during the past month:

	Tested.	Passed.	Condemned.
W. L. Hopper .....	2	2	0
T. H. Davies & Co.....	1	1	0
M. Salado .....	5	5	0
A. N. Campbell .....	2	2	0
Hawaii Meat Co. ....	1	1	0
Waialae Dairy .....	299	277	22

A total of 310 cattle were tested, out of which number 288 were passed and 22 condemned and branded.

This concludes the tuberculin testing for the year, with a total of 3711 cattle tested, with a total of 131 condemned, giving a percentage of 2.76%. This, while not as low as was expected, is a decided drop from the previous year.

#### HEMORRHAGIC SEPTICEMIA IN SWINE.

Two outbreaks of this disease occurred during the month—one at the quarantine station in a bunch of imported hogs, and one in a large piggery at Puuloa. The prompt use of hemorrhagic septicemia vaccine checked both outbreaks with a total loss of 10 hogs.

While hemorrhagic septicemia was the cause of both outbreaks, two distinct types of the disease were represented. The form of the outbreak at the quarantine station was purely pneumonic, the post-mortem lesions showing double pneumonia with pleurisy, while the outbreak at Puuloa was the peracute or septicemic type of a very virulent nature. No intestinal complications were observed in either outbreak.

#### ANTI-RABIC VACCINATION.

Three dogs were immunized against rabies and are apparently doing finely.

#### CANINE DISTEMPER.

This disease, which is more or less prevalent throughout the Territory, has necessitated the vaccination of a large number of dogs at the quarantine station during the month. Some of these arrived showing symptoms of distemper and were treated with curative vaccines, while others were immunized against the disease. These vaccinations had to be made before the rabies treatment could be commenced, thereby increasing the length of the quarantine period.

#### IMPORTATIONS OF LIVE STOCK.

Thirty vessels were boarded and inspected, fifteen of which were found to carry live stock for the Territory.

The following classes of live stock were represented:

Cattle .....	23
Dogs .....	9
Poultry .....	301 crates

Respectfully submitted,

LEONARD N. CASE,  
Territorial Veterinarian.

BY AUTHORITY.

---

## REMOVAL OF STOCK.

Notice is hereby given that, pursuant to Act 65, S. L. 1919, agents of the Board of Agriculture and Forestry will remove, shoot or destroy, without compensation to the owner, the branded wild cattle found within the Makawao Forest Reserve, County of Maui, on and after April 2, 1921.

BOARD OF AGRICULTURE AND FORESTRY,  
By C. S. JUDD, Executive Officer.

January 25, 1921.





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(1920)

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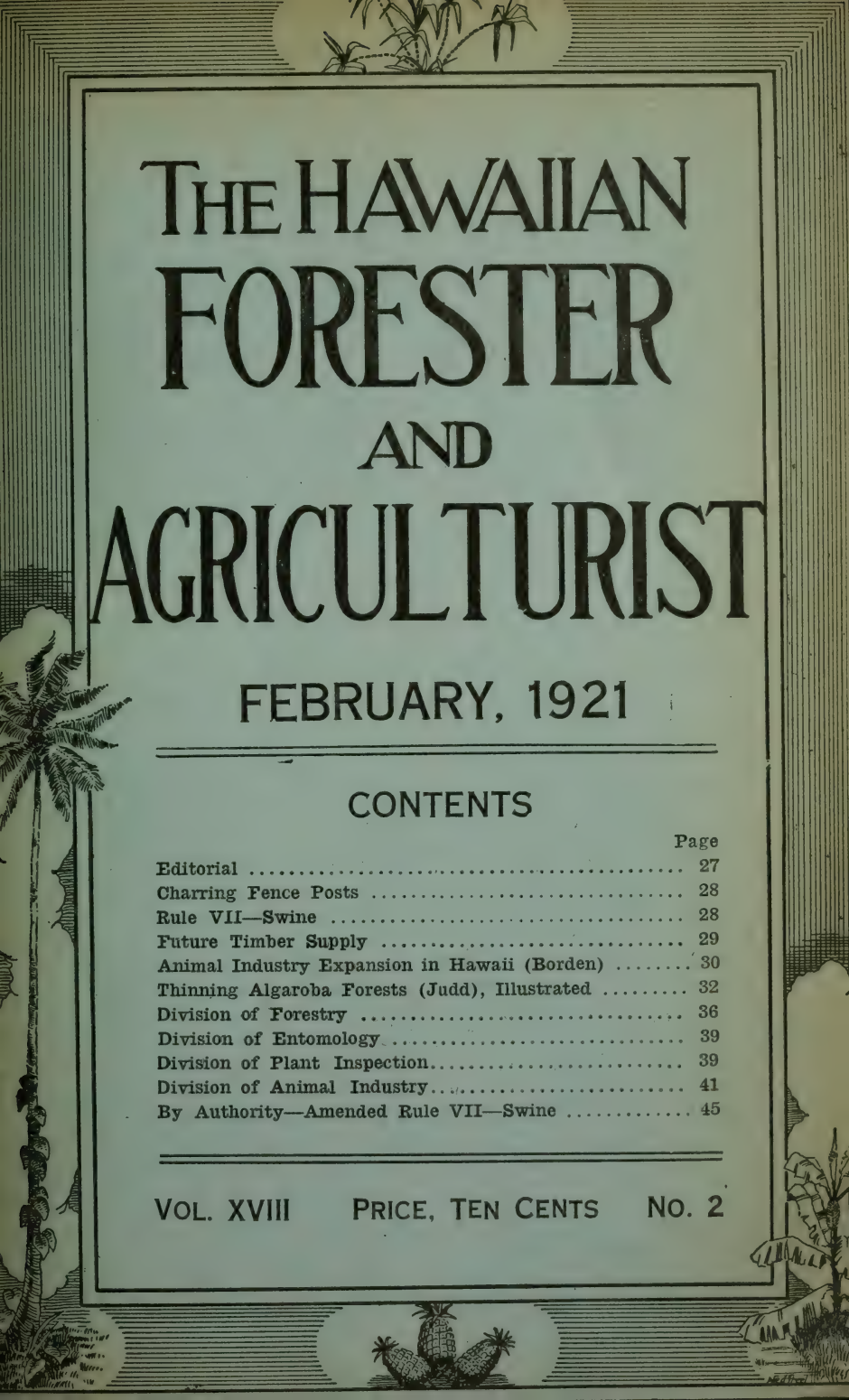
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# THE HAWAIIAN FORESTER AND AGRICULTURIST

FEBRUARY, 1921

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# Board of Agriculture and Forestry

## DIVISION OF FORESTRY.

### FOREST AND ORNAMENTAL TREE SEEDLINGS FOR SALE AT GOVERNMENT NURSERIES.

The Division of Forestry maintains the following nurseries on the several islands from which seedlings of the common forest and ornamental trees may be obtained at cost:

KALAHEO, KAUAI. Nursery at Papapaholahola Spring Reserve in charge of Joe Rita, Jr., Kalaheo.

Trees for planting on Windward Kauai may be obtained from the Kapaa School by applying to Mr. Geo. S. Raymond, Principal.

HONOLULU, OAHU. Government Nursery, King Street, in charge of Forest Nurseryman David Haughs, Box 207, Honolulu. Fresh tree seed may also be obtained from this nursery.

HAIKU, MAUI. Nursery in charge of Forest Ranger James Lindsay, Haiku.

HILO, HAWAII. Nursery at the Boys' Catholic School in charge of Bro. Matthias Newell, Hilo.

PRICES: Plants in seed boxes \$1.00 per 1000. Transplants in boxes 1c each. Transplants in pots 2½c each.

C. S. JUDD,  
Superintendent of Forestry.

## DIVISION OF ENTOMOLOGY.

To give information about insects free of charge is one of the duties of this Division, and Hawaiian readers are hereby invited to make inquiry in person and by mail. In order to be able to advise intelligently or send the right kind of useful insects for relief, we like and sometimes it is indispensable for us to see the insects suspected or caught in the act, also specimens of the injury. In a tin with a hole or two, or a wooden box, specimens may be mailed by parcels post. When specimens are not accompanied by letter, always write your name and address in the upper left-hand corner of the package. Address all communications, DIVISION OF ENTOMOLOGY, P. O. BOX 207, HONOLULU, HAWAII.

D. T. FULLAWAY,  
Entomologist.

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# THE HAWAIIAN FORESTER AND AGRICULTURIST

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VOL. XVIII.

HONOLULU, FEBRUARY, 1921.

NO. 2

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Owing to the storm during January there was very little demand on the government insectary for parasites.

A total of 1,971 koa trees were planted out during January on forest reserve lands in Makiki, Lualualei, and Pupukea, on the Island of Oahu.

Wind erosion takes place at the rate of two feet a year on the Kuliouou Ridge, Oahu, as stated in the January report of the Superintendent of Forestry.

The rule of the Division of Animal Industry relating to the importation of swine was amended on February 11, 1921, and the amended rule appears in this issue.

The suggestions and advice given in Prof. Borden's article in this issue would, if followed out, make this Territory more self-supporting in the matter of food production than it is at present.

This issue of the FORESTER is unavoidably delayed because of the pressure of work due to the publishing of the biennial report of the Board and its four divisions and to important matters connected with the Territorial legislature now in session. The indulgence of the readers is respectfully asked.

With a stumpage price of \$7.00 per cord for algaroba wood and large returns from the beans and nectar which this wonderful tree produces, a most excellent opportunity for the practice of true forestry is offered by the algaroba forests of the Territory. An article on the subject of increasing these yields by judicious thinnings is contained in this issue.

The White or Gray Ironbark (*Eucalyptus paniculata*), according to the Australian Forestry Journal, is the best timber tree of New South Wales and is unexcelled for combined strength and durability. As a railroad tie it will last an indefinite period, and specimens of ties which have borne the heaviest railroad traffic for twenty-five years have been found to be as sound as the day they were laid.

The following resolution was adopted at a meeting of the Board held on February 11, 1921:

*"Resolved*, that in cases of any insubordination, real or fancied, on the part of employees of the Board of Agriculture and Forestry, the Executive Officer be and is hereby authorized and empowered to suspend any employee, not the head of a Division, pending action of the Board."

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## CHARRING FENCE POSTS.

---

As the result of service tests, the U. S. Forest Service is in a position to say that charring is of little value in protecting the butts of fence posts and telephone poles from decay. The charred posts in these tests proved to be even less durable than the untreated ones. Theoretically, an area of charred wood around a post should prevent decay, because charcoal does not decay or encourage the growth of fungi. But the charred area around the post is not usually a solid covering. It is checked through in many places. If posts are seasoned before they are charred, the charring does not reach to the bottom of the season checks which are always present. If green unchecked posts are charred, checks will open through the charred part as the wood seasons. In either case the uncharred center of the post is exposed to fungus infection and will decay as rapidly as any untreated wood.

---

## RULE VII—SWINE.

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Rule VII—Swine of the "Regulations Governing the Importation of Live Stock and Other Animals into the Territory of Hawaii" of the Division of Animal Industry was on February 11, 1921, amended so as to prevent the use of the animal quarantine station of the Board as a mere convenience to shippers who import hogs only for slaughter and so as to safeguard the industry of raising pure-bred hogs in the Territory. The amended rule, which was approved by the Governor on February 11, 1921, and published on the following day, appears on the "By Authority" page of this issue.

Concerning the operation of Section 8 of this amended rule, the Attorney General on February 5, 1921, advised the Board as follows:

"I have examined the proposed rule as amended and return it herewith approved as to form.

"You further inquire as to whether under this rule your



Board would in any case be liable for payment of freight charges on any swine which might be refused landing at a port in the Territory of Hawaii, pursuant to this rule. I do not see how any such liability could possibly arise. All parties engaged in the transportation of freight are presumed to know the law of the port of consignment. If any carrier should accept same for transportation without assuring itself that such swine may be legally landed at the port of destination, such carrier would not be permitted to say that it did not know the law relating to that matter. Under such circumstances no liability could possibly accrue against your Board for refusing to allow such swine to be landed at any port in this Territory."

C. S. J.

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### FUTURE TIMBER SUPPLY.

---

A demand is growing on the part of the wood-using industries and the public at large for a national policy of forestry which will insure adequate future supplies of timber and other forest products, according to Chief Forester W. B. Greeley. Figures gathered by the Forest Service this year, his annual report states, showed the extent of the depletion of the nation's forests, and have served to focus attention on the fact that the country is short of growing forests and that something must be done at once. The acute shortage and skyrocketing prices of lumber and newsprint early in the year also contributed to the growth of the movement.

The Forest Service is advocating a program based on the conviction that the problem is national and not local, and must be handled as such. Nation-wide protection from forest fire for all classes of forest land, Col. Greeley states, is the first and most essential step. It is his belief that the police powers of the States offer the best means of enforcing reasonable requirements against forest destruction.

### LEGISLATION IS NEEDED.

The expense of fire protection, the Forester says, should be borne jointly by the landowner and the public. He holds that Federal legislation is needed to provide for a comprehensive plan of cooperation with the States in fire prevention and the development of forestry practice, and the extension of the national forests through purchases, through the inclusion of other timberlands now in Federal ownership, and through exchange.

There are still large quantities of timber in the United States, the report states, but they are not in the right place. More than

60 per cent of what is left lies west of the Great Plains, far from the bulk of the country's population, agriculture, and manufacture. The country is taking about 26 billion feet of wood from forests each year and is growing only 6 billion.

### MUCH IDLE LAND.

"We have used up our forests without growing new ones," says the report. "At the bottom of the whole problem is idle forest land. The United States contains 326 million acres of cut-over or denuded forest containing no saw timber; 81 million acres of this amount have been completely devastated by forest fires and methods of cutting which destroy or prevent new timber growth.

"The area of idle or largely idle land is being increased by from 3 to 4 million acres annually as the cutting and burning of forests continues." These facts, together with the steadily increasing distance between the average sawmill and the home builder, "have had a vital bearing on the high cost of lumber, which during the year reached a prohibitive figure for many uses and checked the building of homes which is so urgently needed."—*Weekly News Letter*.

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### ANIMAL INDUSTRY EXPANSION IN HAWAII.

---

By PROF. R. J. BORDEN.

Let's give the animal a chance to make good in those parts of Hawaii which are unsuited to our main industries. Let's show our present and future homesteaders the possibilities of animal production which have been only recently shown to the old cotton farmers of the South. It will mean work and cooperation by everyone, but it can be done. It should be done to take away the "black eye" that homesteading seems to have and atone for the many failures made by past homesteaders.

There have been and are some successful homesteaders here, and an analysis of their success will in nearly all cases show that animal industry has been the big factor. The man who will market his field crops directly or indirectly through some animal is building on a solid foundation and has little to fear from any of us.

Almost all home-loving men would like to have a place of their own where they might have a few chickens, some hogs and a cow or two. We all look forward to the time when we can settle down on a small farm of our own. None of us use canned milk or cream by preference, or break our "fresh California

ranch eggs" without some misgiving. We would much rather skim the cream from our own cow's milk and fill the family pork barrel with our own home-grown article. Then, why not do it; in fact, why not make a business of it?

Twenty-five years ago the farmers of the South were mainly cotton farmers. They were having their "ups and downs", but mostly "downs". Someone began to preach animals to them, in order to bring back their former prosperity. Some of them listened and soon stocked their farms. Others followed, and today the South has proved that animal industry is the backbone of their newer agriculture. There are now thousands of excellent farm homes there where herds of cattle and hogs, second to none, are bringing wealth to their owners.

Just consider some of the possibilities from animal production here. The question of a milk supply has been serious for some years past and seems no nearer a solution. We need milk now and we are going to need more milk. There is no reason why, when properly produced and handled and with proper transportation, which we can get if we demand it, we should not produce milk enough here for everyone's needs.

Look at the butter market, too. Notice what large importations of California and Australian butter are required to meet the demand. Those small quantities of Island butter that do find their way to our markets are eagerly grabbed up at a higher price than the imported article. Some inferior butter made in the Islands several years ago gave the home-made product a severe handicap, but lately its quality has improved. With the proper methods of manufacture, packing and marketing, we should be able to put our own butter into every home in the Islands. The market is here and is only waiting for someone who will supply it regularly with well-made fresh butter.

Much has been said and written of late regarding the high cost of pork and pork products of which we in Hawaii consume large quantities. The cheapest meat a man can obtain is the product of his own farm; the most economical ham and bacon obtainable is that produced by transforming truck garden waste, dairy by-products, and garbage into pork. The writer earnestly believes that the hog is the animal that will bring the greatest return to the homesteader, and that unless some hogs are kept on every homestead, the owner is not getting the greatest efficiency from his holdings.

I have recently finished several feeding experiments with hogs. In one of them, one litter of seven hogs weighed 1403 pounds at seven and three-quarters months old. Their feed cost was 17.8 cents per pound. These hogs were fed expensive imported rolled barley at \$85.00 a ton and high-grade tankage at \$105.00 a ton. Feeding was done in self-feeders, and the labor required was practically none, only to see that the self-feeders were kept filled and that water was available. In another experiment,

where kitchen garbage and common garden weeds were fed to a litter of five pigs, 899 pounds of dressed pork were produced in nine months from birth at a cost of about 9.7 cents per pound. These two experiments probably represent the minimum and maximum in hog feeding costs, and show possibilities in this "lowly" animal. Who of us wouldn't eat fresh pork when we could raise it for 25 cents a pound?

Which would you rather have—fresh Island eggs or the imported variety? And yet, why do we import so many? All through the country districts of these Islands, one can find many and various kinds of poultry. As a general rule, these are poorly fed and housed, being left to pick up their living as best they can. They usually lay a few eggs and occasionally "steal their nest" and hatch a few chickens. Very few of their owners know or care how many birds they own, how many eggs they lay, or how old the birds are. Because of these facts, prices of eggs and poultry are high and large quantities have to be imported. We have some egg farmers today who are making a success of this phase of animal husbandry, and we eagerly buy all they have to offer on the market. Should we let the failures of a few who have undertaken poultry raising, stop the further development of this industry? Poultry and eggs can be produced here, and our market can use them. It is not necessary to have a large sum of money in order to start in this industry. A small beginning is very desirable in order to give experience and training which is necessary for final success.

I have not touched on the possibilities of beef and mutton production, as these branches require much more land than the average homestead contains and must necessarily be left to a few who control large grazing areas. But if the average, true homestead communities will set aside a portion of their lands each year for the production of fodder for livestock, and through some community organization, which could buy and sell more advantageously than individuals, put some good dairy cattle, hogs and chickens on each homestead, there will be more prosperity ten years hence among our small farmers, than the future promises for them if the same policy that is being carried out now is continued.

---

## THINNING ALGAROBA FORESTS.

---

By C. S. JUDD, *Superintendent of Forestry.*

The stands of algaroba trees (*Prosopis juliflora*) established through the agency of stock on the arid waste lands in the Territory of Hawaii often occur as dense thickets, which are difficult of penetration by man and beast, on account of the thorny tangle of branches, close growth, and fallen or leaning trees. Such a condition results in retarded tree growth and in undeveloped crowns. The crop of blossoms for bee pasturage and



bean production are also consequently minimized and it is difficult for stock to pick up the beans after they have fallen to the ground.

In order to develop and increase the production of blossoms and beans on algaroba trees, to increase the growth of wood, and to clear up the debris on the ground so that the fallen beans may be readily picked up by the stock or by bean gatherers, it is necessary to thin out such forests artificially by human effort. Such a thinning results in releasing the crowns of the healthiest and the best formed trees and in removing the suppressed and badly-formed trees which would never produce great yields, either of blossoms, beans, or wood.

The object of making thinnings in algaroba forests, therefore, is to improve the remaining stand by securing a space of desirable trees to be left which will promote individual tree development and the greater production of flowers and beans, as well as to clear up the brush so that the beans may be readily gathered.

The usual plan followed is to select the trees which are to be left and mark them by a distinguishing blaze. Such trees are under no circumstances to be cut, but all the remaining trees over three inches in diameter at breast height are removed.

The trees to be marked for cutting are the most substantial, the straight, well-formed, and the healthiest trees, and they are selected so that they will not be closer than 20 feet or more distant apart than 30 feet and as evenly distributed over the area as possible. It is best to mark the trees to be left just in advance of the thinning operations, so that possible mistakes in the marking may be detected and corrected in the next marking of trees to be left.

The trees to be removed in the thinning are cut as close to the ground as possible in order to avoid waste, and except in the case of very large trees, no stumps should be cut higher than 4 inches above the ground.

All brush resulting from the cutting, including the tops and small limbs, must be burned at once while still green, in small piles, so that the trees which are left will not in any manner be scorched or injured by the burning. It is advisable to burn the brush on the stumps where possible in order to prevent sprouting, otherwise the area would grow up within a few years into a tangled thicket of sprouts. No brush pile should be higher than 4 feet, and each pile should be located as far away as possible from all trees that are to be left. By burning the green tops over a small fire of hot coals, much less heat is generated than if tops and brush were allowed to dry before being fired.

Adaptations of this general method of thinning algaroba forests will have to be made as variations in the character of stands are encountered, but by following some such systematic method not only will the yields of an algaroba forest be increased, but the production of wood, beans, and honey from the blossoms will be made permanent and true forestry will then be practiced.









## THINNING ALGAROBA FORESTS.

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Fig. 1. An unthinned algaroba forest, Oahu.

Fig. 2. Clear cutting a dense algaroba forest, Maui.

Fig. 3. A thinned algaroba forest, Oahu.

## DIVISION OF FORESTRY.

REPORT OF THE SUPERINTENDENT OF FORESTRY,  
JANUARY, 1921.

Honolulu, Hawaii, March 1, 1921.

Board of Commissioners of Agriculture and Forestry, Honolulu.

Gentlemen:—I respectfully submit the following report of the Division of Forestry for the month of January, 1921:

## TREE PLANTING.

During the month, in spite of the heavy rains which made work unpleasant, the following trees were planted on four different forest reserves on Oahu: Makiki, 178 koa; Pupukea, 630 koa, 250 mahogany and 450 Australian red cedar; Mikilua, 1163 koa; and Kuliouou, 24 Cook pine (*Araucaria Cookii*), 2 kauri pine, 1 Chinese banyan and 1 Valencia orange; total, 2699 trees.

## FENCING.

During the month five coils of wire and 50 pounds of staples were sent to Fire Warden Marion Cabral at Hana, Maui, who has kindly undertaken the job of supervising the repair of the fence on the boundary of the Koolau Forest Reserve back of the Nahiku homesteads.

One day was spent by Assistant Kraebel and Ranger Ellis in repairing several stretches of fence, amounting to 300 feet, on the boundary of the Kuliouou Forest Reserve, Oahu, where the strong trade wind had during one year blown away two feet of soil on the ridge top and left some of the posts completely exposed.

The work of repairing the fence and building a new river gate across the Waio Mao stream, Palolo Valley, in the Honolulu Watershed Forest Reserve, Oahu, which was damaged by the rainstorm of January 16, was begun on January 27. Approximately 700 feet of boundary fence and the stock gate across the river were destroyed by the flood waters.

Ranger Ellis, with the help of the Mikilua tree planters, completed during the month the repairing of 4950 feet of fence along the Waianae-kai Forest Reserve boundary. This fence is now in good condition and no more trouble should be experienced from the homesteaders' cattle getting into this reserve.

## REMOVAL OF STOCK.

Steps were taken to remove Portuguese squatters' calves from Round Top, and cattle from the Kuliouou and Waianae-kai Reserves on Oahu and from the Makawao Reserve on Maui. All cattle have been removed from these reserves with the exception of a few wild ones which will not be driven. The Maunalua Ranch has been given until February 21 to remove the two head remaining in the Kuliouou Reserve, and on January 28 I began the 60-day publication in the "Maui News" of a notice, under Act 65, S. L. 1919, concerning the removal by April 2 of stock from the Makawao Reserve, Maui, where two head of branded wild cattle still are at large.

## MISCELLANEOUS.

Considerable time was spent during the month on the preparation of the biennial report to the Governor.

An inspection of Waio Mao Valley and the crater in Palolo Valley made on January 21 disclosed the fact that very little damage was done to the

native forest by the cloudburst of January 16, when over 20 inches of rain fell in 36 hours. Although the river bed was scoured out and kukui trees uprooted in the valley bottom, the side gulches somewhat scoured, and a few slides occurred on the palis, the condition of the remaining forest was undisturbed, and if it had not been for this forest, there would have been a much greater flood in lower Palolo Valley and the Waikiki swamps.

Assistance was rendered the Land Office in prescribing methods of thinning and regulations to be inserted in the license for cutting algaroba wood on public land in Lualualei, Oahu, to be sold at auction on February 25.

Respectfully submitted,

C. S. JUDD,  
Superintendent of Forestry.

### REPORT OF THE ASSISTANT SUPERINTENDENT OF FORESTRY, JANUARY, 1921.

Honolulu, Hawaii, February 12, 1921.

Superintendent of Forestry, Honolulu, T. H.

Dear Sir:—The following report of my activities during the month of January, 1921, is respectfully submitted:

The greater part of this month was spent in the Honolulu office upon routine administrative matters. A memorandum was prepared concerning the use of Wailoa River Park of Hilo as an arboretum; some time was spent in transcribing data on the Hilo Forest Reserve and in the preparation of a bibliography of the genus *Ficus*.

In company with the Superintendent, an inspection was made of the Kuliuouou Forest Reserve, Oahu, where a ridge-top fence was found completely undermined by wind erosion, permitting the entrance into the reserve of a number of cattle from the land of Maunaloa east of the reserve. On this trip three wild goats were found and killed on the divide at the mauka edge of the forest. A number of trees of several species were planted along the makai boundary to test their adaptability to this site.

A similar inspection of upper Palolo Valley disclosed considerable damage from the storms of the first two weeks of this month. Numerous landslides on the upper slopes and in the valley bottom, the erosion of the trail and stream banks, uprooting of large trees, and the almost total destruction of the eight-inch water pipe line, the building of numerous gravel banks to a depth of four and five feet by the flood waters, and the destruction of the water gate and 700 feet of forest fence, were among the things that were observed.

On January 22nd a conference, including Mr. Agee and Dr. Lyon of the Planters' Experiment Station, the Superintendent of Forestry and myself, was held to discuss the genus *Ficus*. It was decided to concentrate attention for the present upon the propagation of six species which seem to give the most promise of being useful additions to the forests of Hawaii and which appear unlikely to develop objectionable features. A plan of cooperation between the Hawaiian Sugar Planters' Association and the Territorial Division of Forestry for the administration of the Hilo Forest Reserve was also outlined at this meeting.

The latter part of the month was spent with Ranger Ellis and laborers repairing the forest fences at Kuliuouou and Palolo.

Respectfully submitted,

CHAS. J. KRAEBEL,  
Assistant Superintendent of Forestry.

## REPORT OF FOREST NURSERYMAN, JANUARY, 1921.

Honolulu, Hawaii, February 23, 1921.

Superintendent of Forestry, Honolulu, T. H.

Dear Sir:—My report of work done during the month of January is as follows:

## NURSERY.—DISTRIBUTION OF PLANTS.

Sold.....	445	pot-grown plants
Gratis (including forest reserves).....	3047	“ “
Total.....	3492	“ “

## COLLECTIONS.—GOVERNMENT REALIZATIONS.

Collections on account of plants sold, Nursery, Honolulu.....	\$ 9.10
Collections on account of plants sold, Hilo Nursery.....	2.00
Collections on account of seed sold, Hilo Nursery .....	3.50
Collections on account of wood sold at Pupukea.....	5.00
Rent of office, Nursery grounds, for December, 1920.....	35.00
Total.....	\$54.60

## PRESERVATION, ETC., FOREST RESERVES.

Fees for camp sites at Kokee Camps, Na Pali-Kona Forest Reserve, Kauai: 24 persons paid fees for the period from January 1st to December 31st, 1921, amounting to a total of....\$467.00

## MAKIKI STATION.

The work done at this station consisted of transplanting seedlings, mixing and sterilizing soil, repairing roads, etc.

## HONOLULU WATERSHED.

The work done on the watershed consisted of clearing off and making holes on land at the top of and on the Ewa side of the main Makiki Valley below Mr. L. A. Thurston's property. There is considerable land in this section yet to be planted. The most of this land is above the main springs and the clothing of it with trees is certainly necessary for the preservation of the water. One hundred and seventy-eight koa trees were planted during the month, a large number of holes are now ready, and more planting will be done during February.

## LUALUALEI.

At Lualualei 1163 koa trees were planted.

## SUB-NURSERIES.—TREES DISTRIBUTED DURING JANUARY.

	In Seed Boxes.	In Trans- plant Boxes.	Pot Grown.	Total.
Hawaii Sub-Nursery, Hilo....	1500	.....	..	1500
Maui Sub-Nursery, Haiku....	....	3019	12	3031
Kauai Sub-Nursery, Kalaeheo.	....	1665	..	1665
	1500	4684	12	6196



## ADVICE AND ASSISTANCE.

The writer has on file requests from the officers of the following posts to call and give them advice and assistance in laying out their grounds, planting, etc.: Fort Kamehameha, Fort Shafter, Headquarters Pearl Harbor, Submarine Base, Pearl Harbor, and Ford Island. Visits will be made as soon as possible.

The following number of visits have been made at the request of people in and around the city:

Calls made, 7; advice by telephone, 10; advice by letter, 4; advice given people calling, 7.

A visit to Kalaheo Nursery, Kauai, will be made during February.

Very respectfully,

DAVID HAUGHS,  
Forest Nurseryman.

## DIVISION OF ENTOMOLOGY.

## REPORT OF THE ACTING ENTOMOLOGIST, JANUARY, 1921.

Honolulu, Hawaii, February 28, 1921.

Board of Agriculture and Forestry, Honolulu, Hawaii.

Gentlemen:—During the month of January the insectary handled 9100 pupae of the melon-fly, from which there were bred 2149 females and 1772 males, *Opius fletcheri*.

The distribution of parasites was as follows:

## MELON-FLY PARASITE.

	<i>Opius fletcheri</i> .	Females.	Males.
Oahu:			
Moiiliili .....		300	250
Moanalua .....		600	600

Respectfully submitted,

E. M. EHRHORN,  
Acting Entomologist.

## DIVISION OF PLANT INSPECTION.

## REPORT OF THE CHIEF PLANT INSPECTOR, JANUARY, 1921.

Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—I herewith submit my report of the work carried on by the Division of Plant Inspection for the month of January, 1921, as follows:

During the month 50 vessels arrived at the port of Honolulu, 26 of which carried vegetable matter and seven came through the Canal Zone. The following disposal was made of the various shipments:

Passed as free from pests.....	1293 lots	24,411 pkgs.
Fumigated.....	14 "	14 "
Burned.....	38 "	38 "
Returned.....	12 "	12 "
Total Inspected.....	1357 "	24,475 "

Of these shipments, 24,125 packages arrived as freight, 219 packages as baggage and 131 packages as mail.

#### RICE AND BEAN SHIPMENTS.

During the month 7125 bags of rice and 1573 bags of beans arrived from Japan and were passed as free from pests.

#### PESTS INTERCEPTED.

Approximately 1252 pieces of baggage belonging to immigrants from foreign countries were examined, from which 37 lots of fruit and eight lots of vegetables were seized and destroyed. A tabulated list of material intercepted, other than the above-mentioned fruits and vegetables, follows:

##### From Florida:

January 10—1 alligator pear plant, mail, burned, scale insects and aleurodes.

##### From Japan:

January 7—3 pkgs. chestnuts, baggage, fumigated precautionary.

January 23—3 pkgs. chestnuts, baggage, fumigated precautionary; 1 pkg. peanuts, mail, fumigated precautionary; 1 pkg. vegetable seed, mail, fumigated precautionary; 1 pkg. camellia cuttings, mail, burned, prohibited.

##### From Korea:

January 7—1 pkg. ginger root, mail, fumigated account fungus gnats.

##### From the Philippines:

January 17—1 cocoanut, baggage, burned, prohibited; 1 pkg. seed, mail H. S. P. A. from Williams, fumigated precautionary.

January 23—1 pkg. rice paddy, baggage, burned, prohibited.

January 25—1 pkg. pili nuts, mail, fumigated precautionary; 4 pkgs. betel nuts, mail, fumigated precautionary.

##### From Portugal:

January 18—1 pkg. pine tree seed, mail, burned, prohibited.

#### HILO INSPECTION.

Brother M. Newell, Inspector at Hilo, reports the arrival of five vessels at Hilo. Four carried vegetable matter, consisting of 149 lots and 2973 parcels, all clean. Three thousand one hundred seventy bags of rice and 168 bags of beans arrived from Japan and were passed.

#### KAHULUI INSPECTION.

Mr. L. Gillin, Inspector at Kahului, reports five vessels arriving at Kahului. Four carried vegetable matter, consisting of 20 lots and 2066 parcels, all clean.

#### INTER-ISLAND INSPECTION.

Fifty-seven vessels plying between Honolulu and other Island ports were attended and the following shipments passed:

Taro.....	170	bags
Vegetables.....	147	packages
Fruit.....	135	packages
Plants.....	58	packages
Pineapple shoots.....	946	bags
Seeds.....	8	packages
Sugar cane from H. S. P. A. ....	1	case

---

Total passed..... 1465 packages

Thirty-five packages of plants, three packages of fruit and four packages of sugar cane were rejected on account of infestation, undesirable soil and non-compliance with the regulations.

Respectfully submitted,

E. M. EHRHORN,  
Chief Plant Inspector.

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## DIVISION OF ANIMAL INDUSTRY.

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### REPORT OF THE TERRITORIAL VETERINARIAN, JANUARY, 1921.

Honolulu, Hawaii, February 24, 1921.

Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—I have the honor to submit the following report on the work of the Division of Animal Industry for the month of January, 1921:

#### TUBERCULOSIS CONTROL.

The following cattle were tuberculin tested during the past month:

	Tested.	Passed	Condemned.
Makaweli Plantation (Kauai) .....	21	21	0
Kilauea Sugar Company (Kauai) .....	23	23	0
George P. Cooke .....	1	1	0
O. R. & L. Co. ....	4	4	0
Murphy Horse & Mule Co.....	21	21	0
T. H. Davies & Co. ....	1	1	0

The above gives a total of 71 heads tested, all of which successfully passed the test.

Post-mortem examinations were made on 22 head of cattle condemned during the previous month, all of which were found affected with tuberculosis. Among these, two animals were found with lesions of tuberculosis in the glands of the udder.

In connection with this work and pursuant to a request from Alexander & Baldwin, I left for Kauai on the S. S. Lurline to quarantine and retest 34 head of Holstein cattle imported for the Makaweli and Kilauea Sugar Plantations. In order to accommodate the plantation management as much as possible the cattle were quarantined on the premises of their respective owners. While this necessitated considerable extra work and travel, it appeared to be unavoidable under the circumstances.

In this connection I beg to submit for your consideration certain recommendations in regard to the quarantining of imported stock consigned to

the different islands with special reference to the islands of Kauai and Maui which lack quarantine facilities.

In view of the infrequency and comparatively small number of animals consigned to these islands and of the difficulty attending inspections of live stock at the time of landing, there being no method of notification and long distances to travel to inspect a few animals, and in view of the fact of the possibility of animals being landed on these islands, especially of Kauai, without inspection, and to such an instance does Dr. Golding attribute the outbreak of swine diseases on that island in 1914 entailing the severe outbreak last year, there being a report to the effect that hogs were landed from the S. S. Hyades a number of years ago of which no official notification was ever made, it would seem advisable and it is therefore recommended that in the future all live stock consigned to these two islands subject to quarantine, be quarantined at the port of Honolulu in order that the protection of this Territory against the entrance of infectious and contagious diseases of live stock be rendered more complete.

The Board went to considerable expense in establishing and maintaining a quarantine station at Kahului, Maui, which from disuse and lack of attention gradually went to pieces until at the present time it is totally unfit for the purposes for which it was intended. To rebuild this station will require a considerable outlay which I do not consider justified under the present circumstances. While the quarantining of stock at Honolulu may entail a certain amount of inconvenience to a few importers this should not carry much weight against the disastrous effects which would follow the possible introduction of disease. Where the interests and protection of the Territory as a whole are concerned a certain curtailing of the privilege of the individual must ensue.

The quarantine work of this Division is one of the most important parts of this service and the centralization of this work and bringing it under the control of men whose entire time is occupied with government work is to the best interests of the live stock industry of the Territory. We are about to take up the fight against contagious abortion and allied infectious and contagious diseases of the generative organs of cattle, which at the present time are advancing in alarming proportion and causing considerable losses to the stock owner.

The mainland of the United States and Canada must be considered the source of the infections in this Territory. Consequently the first step must be the promulgation of regulations excluding infections from the outside. This would necessitate the quarantining of all cattle arriving here, their examination and possible treatment before admission to the Territory. It is therefore obvious why a central point of quarantine for stock arriving in the Territory is desirable. The nature of the work is such that it cannot be undertaken by men whose time is largely subject to the calls of practice.

#### ANTI-RABIC TREATMENT.

During the past month eleven dogs were vaccinated against rabies. All are doing well.

#### CANINE DISTEMPER.

Owing to the prevalence of this disease in Honolulu and the presence of several cases at the quarantine station in dogs arriving with well developed symptoms of distemper it has been necessary to treat and immunize a number of dogs before the rabies treatment could be commenced. It would, therefore, seem advisable to make the immunization of pups and young dogs against distemper a routine procedure to be undertaken upon arrival at the quarantine station.



### QUARANTINE STATION.

The long period of inclement weather made things exceedingly disagreeable at the quarantine station and held up for a long time any attempts at cleaning and repairing. Now, however, there are trucks hauling manure and replacing it with sand. All holes in the corrals are being filled and the ground leveled off so that in a short time the conditions will be much improved.

### IMPORTATIONS OF LIVE STOCK.

During the past month a total of twenty-two vessels arriving in Honolulu were boarded and inspected, of which number seven carried stock for the Territory.

The following classes of live stock were represented:

Horses, 3; cattle, 37; swine, 1; dogs, 9; poultry (etc.), 170.

Respectfully submitted,

LEONARD N. CASE,  
Territorial Veterinarian.

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### REPORT OF THE ASSISTANT TERRITORIAL VETERINARIAN, JANUARY, 1921.

Honolulu, Hawaii, February 24, 1921.

Dr. L. N. Case,

Chief, Division of Animal Industry,  
Bureau of Agriculture and Forestry, Honolulu.

Sir:—I have the honor to submit the following report for the month of January, 1921:

### TUBERCULOSIS CONTROL.

During the month of January the following cattle were tested:

	Tested.	Passed.	Condemned.
George Cooke .....	1	1	0
Hawaiian Polo and Racing Club .....	4	4	0
Makaweli Plantation .....	21	21	0
Kilauea Sugar Co. ....	23	23	0
Murphy Horse & Mule Co. ....	21	21	0
T. H. Davies & Co. ....	1	1	0
John Teixeira .....	5	5	0
Total . . . . .	76	76	0

Twenty-one head of dairy cattle from Waialae Ranch, tested and condemned in December, 1920, were examined post-mortem at time of slaughter, tuberculous lesions being found in all.

### CANINE DISTEMPER VACCINATION.

American Railway Express Co.—Dogs, 2.

## SWINE DISEASES.

Two hogs at Mr. A. L. C. Atkinson's Puuloa Ranch, were treated for paraplegia. The cause of the malady was not decided.

The following pigs were treated with hemorrhagic septicemia bacterin: Mr. A. L. C. Atkinson, Puuloa, 3 head; Mr. Edward May, Kuliouou, 12 head.

The three at Puuloa were also injected with mixed infection bacterin (Swine).

## FORAGE POISONING.

A disease among the army mules at Ford Island was investigated and a diagnosis of forage poisoning (Cerebro-spinal meningitis) made.

## RABIES CONTROL.

The following dogs were given anti-rabies vaccine at the Animal Quarantine Station:

H. K. Castle .....	1
Capt. Howell .....	1
B. Focke .....	1
Geo. Fuller .....	2
M. C. Martin .....	1
Admiral Schumaker .....	1
B. F. Hayford .....	1
Col. R. Miller .....	1
C. W. Nimitz .....	1
M. A. Ross .....	1

## LIVE STOCK IMPORTATIONS.

Twenty-two steamers were inspected during January, of which the following carried live stock for this port:

## S. S. LURLINE, San Francisco.

1 Holstein bull .....	T. H. Davies & Co.
20 Holstein heifers, 1 Holstein bull,	
2 Holstein calves .....	Hawaiian Sugar Co.
12 Holstein heifers, 1 Holstein bull .....	Kilauea Sugar Co.
1 Dog .....	M. C. Martin
2 Horses .....	Quartermaster Dept., U. S. A.
23 Crates poultry .....	Various

## S. S. MANOA, San Francisco.

1 Dog .....	Lt. B. F. Hayford
56 Crates poultry .....	Various

## S. S. HOLLYWOOD, Seattle.

1 Horse .....	Admiral Schumaker
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## S. S. PERSIA, San Francisco.

1 Dog .....	H. B. Weller
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## U. S. S. BALTIMORE.

1 Dog ..... Admiral Schumaker

S. S. WILHELMINA, San Francisco.

2 Dogs ..... American Railway Express Co.

1 Dog ..... M. A. Ross

1 Berkshire hog ..... Kamehameha Schools

81 Crates poultry ..... Various

S. S. WEST CACTUS, Orient.

1 Chow dog ..... Dr. F. E. Trotter

Advantage was taken of the presence of Prof. W. L. Williams, Cornell University, in Honolulu, to learn something of the latest methods of handling the breeding diseases of dairy cattle.

Professor Williams gave practical demonstrations at the Kamehameha School dairy, in the examination of bulls and cows for anatomical defects and pathological lesions of the generative organs which might impair their breeding qualities.

During this examination, one of the herd bulls which was imported a few years ago, and which had proved to be an indifferent breeder, was found to have a large schirrous abscess on the left seminal vesicle. This, Professor Williams gave as the cause of his bad breeding qualities, and also the cause of the abortions, metritis and retention of placenta from which the dairy had suffered. The animal was slaughtered, and a post-mortem examination confirmed the diagnosis.

Demonstrations were also given of the method of treating cows which had aborted, and of handling herds in which abortion existed or was suspected. Abortion, metritis and retention of placenta, is due to infection and is present in practically all dairies, causing a great deal of loss and trouble to dairy men.

Few dairy men in these islands realize the cause of the trouble, and attribute them to accidental or traumatic causes. The chance of these conditions being due to accident or traumatism is considered, by Professor Williams, to be nil: because they are entirely due to infection of the organs of generation.

Respectfully submitted,

LLOYD E. CASE,  
Assistant Territorial Veterinarian.

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By Authority.

**TERRITORY OF HAWAII.**

**BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY.**

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**Amended Rule VII—Swine.—Division of Animal Industry.**

The Board of Commissioners of Agriculture and Forestry of the Territory of Hawaii hereby amends Rule VII—Swine of the "Regulations Governing the Importation of Live Stock and Other Animals into the Territory of Hawaii" of the Division of Animal Industry, approved by the Governor on June 8, 1918, to read as follows:

## RULE VII—SWINE.

Sec. 1. All pure-bred swine intended for shipment to the Territory of Hawaii for breeding purposes must be accompanied by a certificate of health issued or approved by an officer of the United States Bureau of Animal Industry or by the State Veterinarian, to the effect that the animals have passed a careful veterinary inspection and are free from any indication of disease, and that neither hog cholera nor swine plague has existed within a radius of 5 miles of the premises on which they have been kept for a period of six months immediately preceding the date of shipment.

Sec. 2. The owner or importer must present an affidavit to the effect that the said certificate refers to the swine in question, that the same have been shipped from the premises mentioned in said certificate in clean and disinfected cars, without unloading, and that they have not been submitted to the serum simultaneous or double treatment for hog cholera within thirty days prior to shipment.

Sec. 3. All pure-bred swine intended for breeding purposes arriving in the Territory without such certificate and affidavit shall be subject to a quarantine of two weeks at the expense of the owner or importer.

Sec. 4. All swine intended for shipment to the Territory of Hawaii for the purpose of slaughter must be accompanied by the certificate and affidavit as in Sections 1 and 2 required.

Sec. 5. Such swine shall be unloaded from the vessel into cars, drays, or trucks and transported direct to the place of slaughter.

Sec. 6. All such cars, drays, or trucks shall be thoroughly cleaned and disinfected under the supervision of the Territorial Veterinarian before being allowed to return for reloading or to be used for other purposes.

Sec. 7. All expense connected with such cleaning and disinfection shall be borne by the owner or importer.

Sec. 8. No swine brought to the Territory for the purpose of slaughter shall be allowed to be landed without the certificate and affidavit mentioned in Sections 1 and 2 hereof.

Sec. 9. The above rule, as amended, shall take effect on February 28, 1921.

Adopted on February 11th, 1921, by the Board of Agriculture and Forestry.

A. L. C. ATKINSON,  
President.

Approved this 11th day of February, 1921.

C. J. McCARTHY,  
Governor of Hawaii.

Honolulu, T. H.







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(1921)

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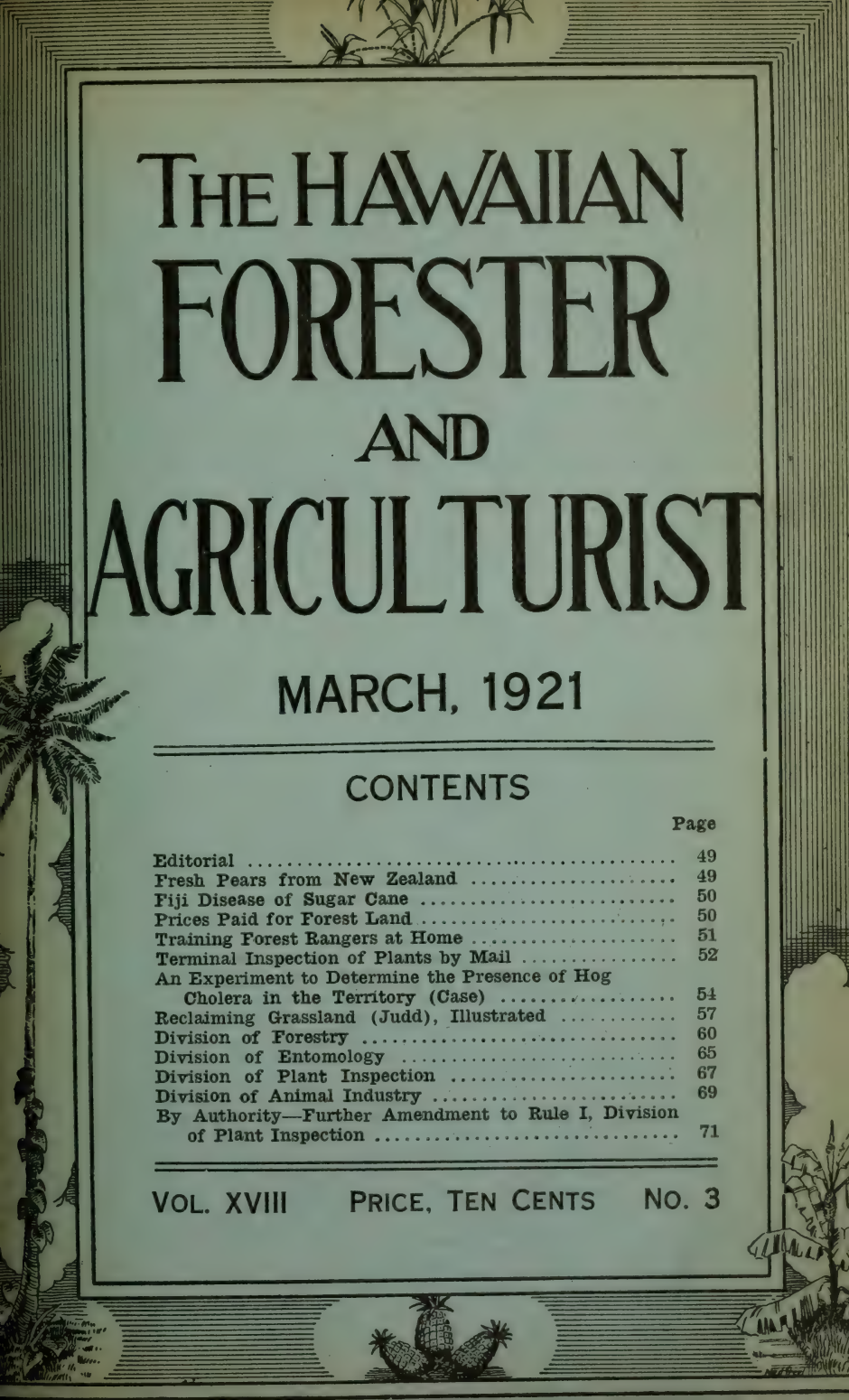
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# THE HAWAIIAN FORESTER AND AGRICULTURIST

MARCH, 1921

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Bro. Matthias Newell, *in charge of Sub-Nursery at Hilo, Hawaii*.  
Joe Rita, *in charge of Sub-Nursery at Kalaeheo, Kauai*.  
David Kapihe, *Forest Ranger for Tantalus, Oahu*.  
E. H. Hipple, *Forest Ranger for Palolo, Manoa, and Nuuanu, Oahu*.  
Daniel Kapahu, *Forest Ranger for Waianae, Oahu*.  
J. P. Pico, *Forest Ranger for Waiaesae-kai Reserve, Oahu*.  
Hosea K. Lovell, *Forest Ranger for Kauai*.  
A. J. W. Mackenzie, *Forest Ranger for Hawaii*.  
James Lindsay, *Forest Ranger for Maui, and in charge of Sub-Nursery at Haiku*.  
Antone P. Aguiar, *Forest Ranger for Panaewa Reserve, Hawaii*.  
Charles E. Stone, *Forest Ranger for Kau and South Kona, Hawaii*.  
Harry L. Denison, *Forest Ranger for Kohala Mt. and Hamakua Pali Reserve, Hawaii*.  
V. L. Ellis, *Forest Ranger at Large*.

## DIVISION OF ENTOMOLOGY.

David T. Fullaway, *Entomologist*.  
Quan Chew, *Laboratory Assistant*.  
Rodrigo Villafior, *Insectary Assistant*.

## DIVISION OF PLANT INSPECTION.

Edward M. Ehrhorn, *Chief Plant Inspector*.  
L. A. Whitney, *Assistant Plant Quarantine Inspector and Laboratory Assistant*.  
Bro. M. Newell, *Fruit and Plant Inspector, Hilo, Hawaii*.  
Louis Gillin, *Fruit and Plant Inspector, Kahului, Maui*.  
E. E. Madden, *Honorary Plant Inspector at Mahukona, Hawaii*.  
Geo. B. Leavitt, *Honorary Plant Inspector at Eleele, Kauai*.  
G. C. Munro, *Honorary Plant Inspector at Manele, Lanai*.  
Miss Ruth Seybolt, *Inspectors' Clerk*.

## DIVISION OF ANIMAL INDUSTRY.

Leonard N. Case, *Superintendent and Territorial Veterinarian*.  
Lloyd E. Case, *Assistant Territorial Veterinarian*.  
H. B. Elliot, *Deputy Territorial Veterinarian, East Hawaii*.  
A. R. Rowat, *Deputy Territorial Veterinarian, West Hawaii*.  
J. C. Fitzgerald, *Deputy Territorial Veterinarian, Maui*.  
Cyril Golding, *Deputy Territorial Veterinarian, Kauai*.  
Joseph Richard, *Livestock Inspector*.

## CLERICAL STAFF OF BOARD.

Miss M. T. Kelly, *Clerk and Stenographer*.  
Miss Florence A. White, *Librarian and Stenographer*.



# THE HAWAIIAN FORESTER AND AGRICULTURIST

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VOL. XVIII.

HONOLULU, MARCH, 1921.

No. 3

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An interesting experiment in connection with hog cholera is described by the Territorial Veterinarian in this issue.

By amending Rule I of the Division of Plant Inspection it is hoped that Honolulu people will soon be enjoying fresh pears from New Zealand.

One new forest reserve will soon be added to the list of 47 now established in the Territory and this will embrace forest lands in Waimanalo and Kailua on the island of Oahu.

The Division of Forestry is making progress in its fencing program by repairing existing fences and building new ones where they are needed to keep stock out of the forest reserves.

The initiation of an experiment to determine whether Hilo grass areas may be overcome by the broadcast sowing of haole koa seed is described by the Superintendent of Forestry in this issue.

Honolulu and Hilo have recently been made the places at which terminal inspection shall be made of all plants and plant products coming by mail to any address in this Territory. The formal notice of this is printed in this issue.

The paper mill at Olaa, Hawaii, is now turning out a heavy grade of paper which is being shipped to Oahu for use in the pineapple fields. The young pineapple plants are set out in holes cut in the paper and are allowed to develop while the growth of all grass and weeds under the paper is prevented through lack of sunlight and air.

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## FRESH PEARS FROM NEW ZEALAND.

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At the request of Mr. A. Moritzson, Rule I of the Division of Plant Inspection was on March 23, 1921, amended so as to allow the importation into the Territory of Hawaii of fresh pears from New Zealand under certain conditions.

Before adopting the amendment the Board received the assurance from the leading entomologists of the Territory that

there would be no objections to allowing the entry of fresh pears, that are free from infestation, from New Zealand.

It will be remembered that this rule was on October 31, 1919, amended so as to allow fresh apples to come to Hawaii from New Zealand. To date shipments of apples have not been made owing to the impossibility of securing cargo space.

The amendment to allow the entry of pears was approved by the Governor on March 24, 1921, and is published on the By Authority page of this issue.

C. S. J.

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### FIJI DISEASE OF SUGAR CANE.

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On March 8, 1921, an announcement was received from the Chairman of the Federal Horticultural Board of the presence of the Fiji disease of sugar cane in the Island of Mindoro, Philippine Islands, where it is doing a large amount of damage especially on the Hawaiian 109 variety. This destructive disease has not been reported from other cane countries except Fiji and possibly New Guinea. Steps have been taken to prohibit the movement of cane seed from Mindoro to Luzon and other cane growing islands in the Philippines.

The presence of the Fiji disease in the Philippine Islands was already known here previous to this announcement and the Chief Plant Inspector of this Board is taking every precaution in his inspections to keep this disease out of Hawaii by enforcing the provisions of Rule I of his Division which absolutely prohibits the entry of sugar cane into this Territory from other countries.

C. S. J.

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### PRICES PAID FOR FOREST LAND.

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The National Forest Reservation Commission which makes recommendations to Congress for the purchase of lands for National Forest purposes on the headwaters of navigable streams under the Weeks law authorized, up to the end of 1920, the purchase of private lands for this purpose at a cost of about \$10,500,000.00 and this year has asked Congress to make a lump sum appropriation of \$10,000,000.00 to enable the Commission to continue its purchase program.

The following table shows the acreages purchased in the last nine years and the average price paid per acre:

Year	Acres	Average Price Per Acre
1912 .....	22,820	\$5.99
1913 .....	415,603	4.75
1914 .....	353,634	5.10
1915 .....	244,173	5.90
1916 .....	54,898	5.96
1917 .....	175,463	4.86
1918 .....	185,199	5.12
1919 .....	103,355	6.35
1920 .....	101,428	4.44
	<hr/> 1,856,573	<hr/> \$5.24

### TRAINING FOREST RANGERS AT HOME.

The desirability of training forest rangers at home for service with this Board in the administration and protection of the forest reserves of the Territory of Hawaii is set forth in the following letter which has been endorsed by President Atkinson and transmitted to Dr. A. L. Dean, President of the University of Hawaii.

Honolulu, Hawaii, March 3, 1921.

Hon. A. L. C. Atkinson

Regent, Ex Officio, of the University of Hawaii  
and President, Board of Agriculture and Forestry.

Dear Mr. Atkinson:—In order to develop the work of the Division of Forestry of this Board in a proper manner, and to take adequate care of the government lands in the forest reserves, it will be necessary in the near future to employ forest rangers of a better type than those who are at present holding the position, i. e., men who have had some training in the technical end of forest work. I would prefer to employ island boys as forest rangers rather than to import technically trained rangers from the mainland, because the island boy is acquainted with the geography, nomenclature, language, and the customs of the Territory, and in these respects is far ahead of any malihini. Given an island boy of the proper temperament and personality, all that is required is to train him in the essentials of forestry in order to fit him for forest work in these islands.

I wish to propose, and would appreciate it very much if you would kindly take up with the Regents of the University of Hawaii, the plan of giving at the University sufficient courses to train the island boy in the elements of forestry with the idea of fitting him for the position of forest ranger in the Territory.

Courses in surveying and botany, which the future forest

ranger would wish to take, are already given at the University and to these should be added courses in forest management, silviculture, forest protection, forest mensuration, forest improvement and fire protection.

I understand that the scope of the courses given at the University of Hawaii is constantly increasing, and I should like to see instruction given in the above subjects as soon as it is feasible to do so. Both Mr. Kraebel, the assistant superintendent, and myself, would be glad to assist in outlining the courses and giving instruction so far as our time permits.

In scores of state colleges and universities on the mainland, courses are given in forestry with the idea of training young men for rangers, and I should like the same done in the University of Hawaii.

I believe that the adoption of this plan would be of great benefit to the Territory, and if you favor it, I should like to see it put into effect.

Véry sincerely yours,

C. S. JUDD,  
Executive Officer.

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### TERMINAL INSPECTION OF PLANTS BY MAIL.

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Word has recently been received from the Federal Horticultural Board at Washington, D. C., that the Honolulu and Hilo Post Offices have been designated by the Post Office Department as the places at which terminal inspection shall be made of all plants and plant products coming by mail to any address in the Territory of Hawaii.

This action, taken in the interest of protecting the agricultural industries of Hawaii, is the result of a request made of the Secretary of Agriculture on April 11, 1919, by the Board of Commissioners of Agriculture and Forestry, which has provided for the proper inspection of plants and plant products at Honolulu and Hilo.

The original request of the Board of Agriculture and Forestry was turned down by the Secretary of Agriculture on the ground that the Act of March 4, 1915, providing for terminal inspection of mail shipments of plants and plant products was applicable only to the States and therefore did not include the Territory of Hawaii (another instance of Hawaii being overlooked).

Through the kind offices of Mr. C. L. Marlatt, Chairman of the Federal Horticultural Board, it was found possible to grant the Board of Agriculture and Forestry's request under the parcel post law and the result was the issuance on February 17, 1921, of the following instructions of the Acting Third Assistant Postmaster General:



## Plants and Plant Products Addressed to Places in Hawaii.

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Third Assistant Postmaster General,  
Washington, February 17, 1921.

The Territory of Hawaii has established places for the terminal inspection of plants and plant products under the provisions of the act of March 4, 1915, embodied in section 478 1/4, P. L. and R., appearing on page 49 of the May, 1915, supplement to the Postal Guide.

All postmasters are, therefore, informed that packages containing plants or plant products addressed to places in the Hawaiian Islands may be accepted for mailing only when plainly marked so that the contents may be readily ascertained by an inspection of the outside thereof. The law makes the failure so to mark such parcels an offense punishable by a fine of not more than \$100.

The plants and plant products subject to terminal inspection in the Hawaiian Islands are described as follows:

"All florists' stock, trees, shrubs, vines, cuttings, grafts, scions, buds, fruit pits and other seeds of fruit and ornamental trees and shrubs, and other plants and plant products in the raw or unmanufactured state, except vegetable and flower seeds: *Provided*, That this list of plants and plant products shall not apply to plants and plant products shipped under the certification of the Federal Horticultural Board of the United States Department of Agriculture."

Postmasters within the Hawaiian Islands shall be governed strictly by the provisions of paragraphs 3, 4, 5, and 6, section 478 1/4, P. L. and R., in the treatment of all packages addressed for delivery at their offices containing any of the plants or plant products above described as subject to terminal inspection.

Inspection service is maintained at the places in the Hawaiian Islands named below, and all postmasters in the Hawaiian Islands shall, after receiving the required postage therefor, under the provisions of section 478 1/4 P. L. and R., send to the nearest inspection point each package containing plants or plant products subject to terminal inspection:

Honolulu,

Hilo.

Owing to the perishable character of plants and plant products, the packages containing such matter must be given prompt attention.

Any failure of compliance with the foregoing instructions or with the provisions of section 478 1/4, P. L. and R., coming to the attention of any postmaster should be reported to the Third Assistant Postmaster General, Division of Classification.

W. J. BARROWS,  
Acting Third Asst. Postmaster General.

This order means that the Division of Plant Inspection of the Board of Agriculture and Forestry will be enabled to keep a close check on all mail importations of plants and plant products which hereafter will be inspected only at the Honolulu and Hilo Post Offices. In this manner all such plants will be thoroughly gone over in the effort to keep new plant pests from gaining an entrance into this Territory.

Packages containing plants or plant products addressed to places in Hawaii will be accepted for mailing only when the contents are plainly marked on the outside. After the contents are inspected at the Hilo or Honolulu Post Offices and are passed as being free from pests they will be forwarded to the addressee.

C. S. J.

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## AN EXPERIMENT TO DETERMINE THE PRESENCE OF HOG CHOLERA IN THE TERRITORY.

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By LEONARD N. CASE.  
*Territorial Veterinarian.*

Hog cholera, an infectious and contagious disease of swine is caused by an organism so small as to be ultra-microscopic and which will easily pass through the pores of a filter fine enough to prohibit the passage of all other forms of organic life. This phenomenon led to this disease being known as the "filterable virus disease of swine" and also enabled investigators definitely to distinguish this disease from other diseases of swine such as swine plague and the so called mixed infections, the post-mortem lesions of which so closely resemble those usually associated with hog cholera as to be exceedingly confusing.

Having the means at our disposal of definitely determining the presence or absence of a disease, an experiment was started with a view to ascertaining whether or not the "filterable virus disease" was present among the swine of this Territory and instructions were given to forward samples of blood from hogs suspected of being sick or dead from hog cholera.

Consequently on February 14, 1921, a sample of defibrinated blood was received which had been taken from a hog said to be sick from cholera. Several animals had died in this herd and the diagnosis made on post-mortem examinations was reported as "cholera without a doubt."

This sample of blood was taken to the bacteriological laboratories of the Tripler General Hospital at Fort Shafter and carefully filtered through a Berkefeld filter. Acknowledgement is hereby made of the courtesy and assistance accorded me by the officials in charge of these laboratories.

The three animals used in the experiment were well bred Berkshires of about eight months of age, the property of the caretaker of the quarantine station and had been in his possession

about four months. They were perfectly healthy, in fine condition and free from parasites. They had never been treated in any way. Two came from a herd on Oahu and one from Hawaii and the herds from which they came had never been exposed to cholera or treated with vaccines of any description. The three animals were therefore considered fit subjects for the experiment.

On February 19, two of the above hogs received intramuscular injections of the filtered blood as follows:

Hog No. 1 6 mil.

Hog No. 2 10 mil.

Hog No. 3 was not injected but was left in contact with the others. During the experiment the animals were fed, watered and otherwise cared for in the same manner as before the experiment.

In experiments of this nature 2 mil. is usually considered sufficient. A much larger dose was used in this case so as to leave no doubt that a sufficient amount of the virus entered the system to produce results.

Symptoms of cholera should have appeared in from eight to twenty days after injection of the filtrate. Six weeks have now passed and the animals are in fine condition having gained at least a hundred pounds in weight. This shows conclusively that as far as that particular sample of blood is concerned the virus of hog cholera was not present.

Of course, far reaching conclusions should not be based on one experiment. A number of such experiments will have to be made before it can be definitely stated that hog cholera does not exist in this Territory, but as far as we have gone there is no evidence to show that the introduction of hog cholera virus is warranted.

When it is definitely ascertained that hog cholera is present the necessary methods for its control and eradication will be instituted. There is a certain amount of danger connected with the indiscriminate use of hog cholera virus which should not be regarded lightly. To quote from the 1920 report of the State Veterinarian of California, "Occasionally so-called 'breaks' occur after hog cholera vaccination with the result that the owner will sometimes question the reliability of the vaccination. As a matter of fact 'breaks' in most cases, can be attributed to the fact that the hogs were suffering with a mixed infection, and hog cholera, if present, was not the primary cause. A correct diagnosis is all important in the treatment of sick hogs. The use of hog cholera virus and serum when no cholera exists means a waste of much time and expensive materials and will do no good when the loss is due to other causes."

Quoting from Circular 176 of the Agricultural Experiment Station, University of California:

"The only protective treatment that will give satisfactory re-



sults, if the herd is infected, is anti-hog cholera serum . . . Prompt use of the serum in an infected herd will save most and possibly all the herd. As a preventive treatment in sound herds, serum will protect every hog against cholera."

Again quoting from this Circular:

"Vaccination is not advised in any locality unless there is cholera present in the herd, or it is exposed to the infection. General vaccination of all hogs would be a needless expense and might spread cholera in localities free from the disease."

All this goes to show that the presence of hog cholera should be demonstrated beyond all question before the introduction and use of virus is permitted. It is fully realized that restrictions placed on the use of virus has met and will continue to meet with considerable criticism, but a large part of this criticism is unjust. That a strict control of the use of hog cholera virus is imperative is borne out by the following quotation taken from the report of the Committee on Hog Cholera Control read at the twenty-fourth annual meeting of the United States Live Stock Sanitary Association, Chicago, Illinois, November 29, to December 1, 1920.

"Your committee repeats with emphasis the statement in the report made last year to this association on the same subject, that a closer restriction must be exercised over the distribution of hog cholera virus. It is realized that efforts along these lines on the part of state officials might subject them to unjust criticism; but control over virus as well as the curbing of incompetent services in the use of serum and virus, is a matter that demands urgent attention by the authorities vested with legal powers to deal with these abuses. The sale of virus should not be permitted within any state except to those duly qualified and holding permits from the proper officials."

"It is obvious for the serum manufacturer and the practicing veterinarian to urge general vaccination of hogs, but officials interested in the ultimate eradication of hog cholera know that the problem involves other phases besides promiscuous inoculation. We must couple the treatment with earnest and sincere efforts regarding quarantine, sanitation, the cleaning and disinfection of premises and the proper disposal of dead animals. The swine grower must realize that this class of animals requires as much care and attention in the way of diet, housing, etc., as do the rest of his live stock. A greater degree of attention, on his part, to the hygienic conditions of his premises will often prove an effective means of avoiding losses from disease, including hog cholera."

There is a noticeable disposition on the part of a large majority of the swine raisers in the Territory to consider that the hog can dispose of most anything in the way of feed and live and thrive under all kinds of conditions. The present hog is an unnatural animal in that he is the product of intensive breeding toward the elimination of surplus bone and a super-production of



flesh so that he has become probably the most susceptible animal to disease that the veterinarian has to deal with. Consequently, the greatest care must be exercised in the management of swine-raising establishments if loss from disease is to be controlled.

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## RECLAIMING GRASSLAND.

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By C. S. JUDD,  
*Superintendent of Forestry.*

One of the problems which confronts the Division of Forestry in the administration of the forest reserves of the Territory of Hawaii is the contest with Hilo grass (*Paspalum conjugatum*). Where the native Hawaiian forest has been denuded by cattle depredations or by fire, an invasion of this vigorously growing introduced grass is almost sure to follow especially where there is a fair amount of moisture. As the few remaining trees gradually die and disappear this grass covers the ground with a solid mat, often two feet high, so that naturally-sown tree seed has no chance for germination and large areas of former forest land are in consequence converted to permanent grassland. The Hilo grass cover is not nearly as satisfactory for the purpose of conserving the runoff as the association of plants of the indigenous forest represented by trees, vines, ferns, bushes, and mosses. It is desirable, therefore, to find some means whereby Hilo grass may be eliminated and grassland areas turned back again into forest.

For this reason the experiment described in the following pages was initiated on March 17, 1921, in the Honolulu Watershed Forest Reserve, in the effort to determine whether areas covered by Hilo grass could be reclaimed by shading out the grass through the establishment of a stand of trees and having them serve as a nurse crop for other trees. The species used was haole koa (*Leucaena glauca*), which is called ipil-ipil in the Philippines.

The idea is not original but was obtained from forest practice in the Philippine Islands where it has been used with success in reclaiming grassland. There over 40 per cent of the total land area of the islands is covered, to the exclusion of almost all other forms of vegetation, with cogon grass (*Imperata exaltata*) which is useless for grazing, is a fire menace, destroys the productivity of the soil in which it grows and, worst of all, is the breeding place of the locusts which yearly swarm over the islands and damage crops to such an extent that the government is compelled to spend great sums of money in trying to exterminate them. This tree has been found to kill out cogon grass within two years. No preparation is necessary other than burning the cogon just before the rainy season and broadcasting the seeds.

In the Philippines the seed of this tree is not naturally distributed far from the parent tree but its ability to seed at an early

age (one year) is accountable for the relatively rapid spread of the species. The seedlings develop a strong tap root which enables them to thrive in competition with cogon grass on dry sites. In the open individual trees attain a diameter of 10 inches and a height of 32 feet. In dense stands the individual trees develop into slender poles with a short bushy tuft of very slender branches at the top. The interior of such stands is devoid of any ground cover other than seedlings of the same species and is a veritable thicket in which grass has no chance to grow.

A recent count of seedlings of *Leucaena glauca* approximately two years old on a sample plot one-four hundredths of an acre in size in the eucalyptus forest on Tantalus Ridge, Honolulu Watershed Forest Reserve, Oahu, gave the following results.

#### SEEDLINGS.

Diameter Inches	Number of Seedlings	Average Height Feet
.25	75	6
.50	74	9
.75	40	12
1.00	21	15
1.25	10	17
1.50	6	20
1.75	8	21
2.00	2	22
2.25	3	23
2.50	2	24

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Total.....241

At this rate there are 96,400 seedlings two years old per acre in this naturally sown stand. The germination per cent of haole koa seed collected in Makiki Valley, Honolulu, is 85 by an actual sprouting test. By count there are 9,856 seeds in one pound. To obtain a stand of trees approximating this natural yield it would be necessary, therefore, to broadcast the seed at the rate of 12 pounds (100,531 viable seed) per acre. To cover a wider scope and to allow for contingencies such as the lack of fresh seed, and poor soil or moisture conditions, the plan followed in the experiment under discussion was to sow seed on the differently prepared plots at the rate of 10, 20, and 30 pounds per acre.

Stands of such a heavy density pass the fire danger by the end of three years and completely eliminate the grass. They thus prepare the area for the later establishment of forest species. Where the haole koa occurs in small groups at short intervals in grass areas, the grass in between the clumps is less vigorous than when growing alone. Other trees planted in between these clumps or near them would be given the shade that they require

# RECLAIMING GRASSLAND

*Experiment to determine whether Hilo grass (*Paspalum conjugatum*) areas may readily be replaced by broadcast sowing of seed of haole Koa (*Leucaena glauca*) Initiated March 17, 1921, in Nuuanu Valley, 3.5 mi. from Honolulu P.O., 450 ft SE of No. 2 reservoir, elevation 760 ft., average annual rainfall 110 inches Honolulu Watershed Forest Reserve, Oahu, Terr. of Hawaii.*

## PLAN OF PLOTS

*Each plot contains one-hundredth acre.*



### PLOT 1

*Untreated*

*Sown to 1.6 oz seed or at  
the rate of 10 lbs. per acre*

### PLOT 2

*Untreated*

*Sown to 3.2 oz seed or at  
the rate of 20 lbs per acre*

### PLOT 3

*Untreated*

*Sown to 4.8 oz seed or at  
the rate of 30 lbs per acre*

### PLOT 4

*Hilo grass burned*

*Sown to 1.6 oz seed or at  
the rate of 10 lbs per acre*

### PLOT 5

*Hilo grass burned*

*Sown to 3.2 oz. seed or at  
the rate of 20 lbs per acre*

### PLOT 6

*Hilo grass burned*

*Sown to 4.8 oz seed or at  
the rate of 30 lbs per acre*

### PLOT 7

*Burned and plowed*

*Sown to 1.6 oz seed or at  
the rate of 10 lbs per acre*

### PLOT 8

*Burned and plowed*

*Sown to 3.2 oz seed or at  
the rate of 20 lbs per acre*

### PLOT 9

*Burned and plowed*

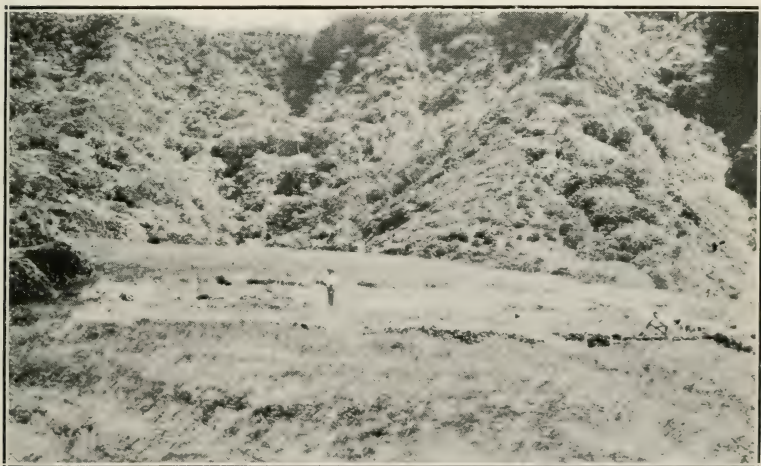
*Sown to 4.8 oz seed or at  
the rate of 30 lbs per acre*





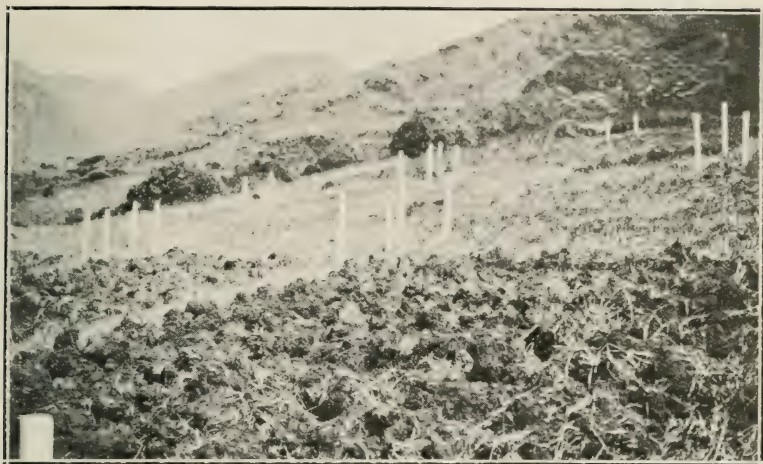


General View of Grassland Area in Nuuanu Valley Before the Experiment  
was Started.

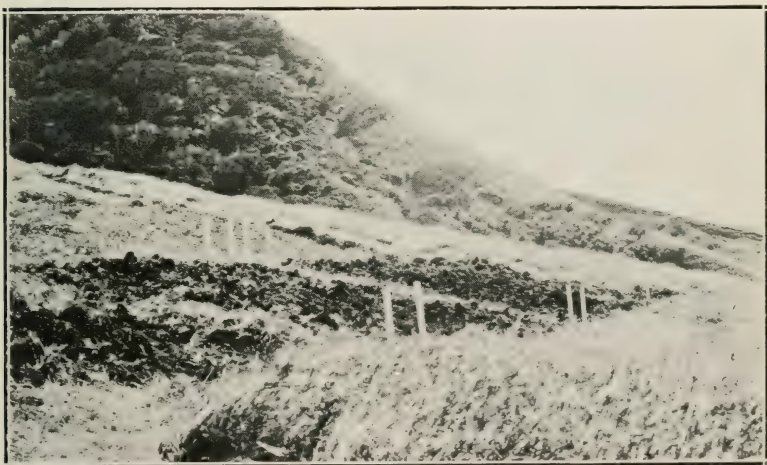


View of Surrounding Forest Area and of the Experiment While the Plots  
Were Being Prepared.





View of Prepared Plots from the West Corner Looking East, Showing  
Plowed Plots in the Foreground, Burned Plots in the Middle, and  
Untreated Plots Furthest up the Slope.



View of Prepared Plots from the North Corner Looking South, Showing  
Dense Mat of Surrounding Hilo Grass.





in youth and would find more moisture and better soil than in pure grass areas. The haole koa would prevent their overtopping by the grass and would also stimulate them to rapid height growth.

The area in the Honolulu Watershed Forest Reserve, chosen for the experiment is situated on a gently sloping flat-topped ridge facing the north-west and exposed to strong trade winds at an elevation of 760 feet above sea-level, 3.5 miles from the Honolulu Post Office and about 450 feet south-east of No. 2 reservoir in Nuuanu Valley, where the average annual rainfall is approximately, 110 inches.

The area was covered by a pure stand of Hilo grass, matted thick and growing very close and rank and about two feet high. All vestige of former forest cover had disappeared but in the neighboring gulches and on the mountain sides above are found the native koa (*Acacia koa*) and alakea (*Bobea clatior*) on the well-drained soil, the kukui or candlenut tree (*Alcurites moluccana*) in the gulch bottoms, and the introduced waiawi guava (*Psidium Guayana pyrifera*). The smaller plants in the region are the common introduced guava (*Psidium Guayana*), naupaka (*Scaevola Chamissoniana*) and the ti plant (*Cordyline terminalis*).

Nine plots, each 20.8 feet on a side and containing one-hundredth of an acre each, separated by a three-foot path, were laid out on the ground, as shown in the accompanying diagram, and marked at the corners with 2" x 2" x 4' painted white stakes. The grass on plots 1, 2, and 3 was left as it was found. The grass on plots 4, 5, and 6 was burned. The grass on plots 7, 8, and 9 was burned and the ground then dug up with mattocks, thus receiving the same treatment as if plowed.

After the plots had been thus treated, seed of the haole koa, picked two weeks previously in Makiki Valley, was, on March 17, 1921, sown broadcast on the plots in the following manner. On plots 1, 4, and 7, 1.6 ounce of seed was sown on each or at the rate of 10 pounds per acre. On plots 2, 5, and 8, 3.2 ounces of seed was sown on each or at the rate of 20 pounds per acre. On plots 3, 6, and 9, 4.8 ounces of seed was sown on each or at the rate of 30 pounds per acre.

After the seed was sown on plots 1, 2, and 3, the grass was trampled down. On the day following the sowing of the seed there came a soaking rain which lasted two days.

The purpose of the experiment is to determine:

1. Whether the haole koa will germinate and establish itself if the seed is merely sown on Hilo grass areas.
2. Whether seed sown broadcast on Hilo grass areas which have been burned will readily germinate and form a forest.
3. Whether a better stand will be secured if the grass is burned and the ground plowed.
4. Which amount of seed, 10, 20, or 30 pounds per acre, gives the most satisfactory results.

The experiment will be run for at least three years and counts of seedlings will be made every six months and reported from time to time in this publication.

The accompanying photographs show the area before and after treatment and illustrate the character of the country in which the experiment is located.

## DIVISION OF FORESTRY.

### REPORT OF THE SUPERINTENDENT OF FORESTRY, FEBRUARY, 1921.

Honolulu, March 18, 1921.

Board of Commissioners of Agriculture and Forestry, Honolulu.

Gentlemen:—I respectfully submit the following report of the Division of Forestry for the month of February, 1921:

#### TREE PLANTING.

The planting during the month was confined almost entirely to the native koa (*Acacia koa*) of which 2,060 trees were set out at Mikilua in the Lualualei Forest Reserve, 774 on the slopes of Tantalus in upper Makiki Valley in the Honolulu Watershed Forest Reserve, and 2 in the Kulioou Forest Reserve, Oahu, making a total of 2,836 koa trees. In connection with other work at Kulioou the following trees were also set out on that reserve on February 17: 36 Cook pine (*Araucaria Cookii*), 2 kauri pine (*Agathis australis*), 2 allspice (*Pimenta officinalis*), 2 Aralia (*Brassaia actinophylla*), 2 Queensland nut (*Macadamia ternifolia*), and 2 lime (*Citrus medica acida*), making a grand total for the month of 2,882 trees planted in forest reserves.

The following trees were sent over to the Waiahole Reserve on February 21 for planting out on that reserve: 30 Cook pine, 25 allspice, 50 macadamia nuts, 5 Benguet pine (*Pinus insularis*), 2 Teak (*Tectona grandis*), and 40 limes.

#### FENCING.

Fire Warden Marion Cabral reports that approximately one mile of the boundary fence of the Koolau Reserve back of the Nahiku homesteads on Maui was repaired during the month and that the work is progressing nicely.

On Waiomao Valley, Palolo, the Honolulu Watershed Forest Reserve boundary fence was renewed after storm damage by the construction of a new water gate and 470 feet of new fence.

The fence around the Honuaula Forest Reserve in North Kona, Hawaii, has also been repaired by adjacent ranchers in cooperation with this Division, and the stock driven out.

The fences bounding portions of the forest reserve areas along the Volcano Road near Glenwood, Hawaii, are also being repaired by Ranger Mackenzie.

Ranger Lovell reports progress in similar work on the boundaries of the Kealia and Moloaa Reserves on Kauai.

On February 18, Forest Ranger at Large V. L. Ellis was sent to Kula, Maui, to complete the half-mile of fence between Kanahau and Kalepeamoa at an elevation of 8,000 feet on the upper boundary of the Kula Forest Reserve. He reports the weather very unpropitious for the work and labor and work animals very difficult to obtain.

## FOREST FIRE AT WAIOLI, KAUAI.

Fire Warden W. F. Sanborn reported a fire of one acre in extent on the land of Waioli, Halelea Forest Reserve, Kauai, on February 21, which resulted from the burning off of dead grass by Princeville Plantation on adjacent government leased land. A sudden change of wind caused the fire to jump across the line and burn up one of the steep ridges on to the forest reserve. A warning to use greater caution in the use of fire for this purpose has been issued.

## VEGETABLE SEED RECEIVED.

A consignment of 24 bags of U. S. Department of Agriculture vegetable seed, sent at the instance of our Delegate to Congress, was received on February 1, and has been widely distributed throughout the Territory.

## TRAINING FOREST RANGERS LOCALLY.

A suggestion has been made to the Regents of the University of Hawaii that as soon as feasible additional courses be given at that institution so that local boys may be trained for the position of forest ranger for the service of this Division. This plan is followed in the Philippines and I would like to see it adopted here for the island boy has many advantages over the *malihini*.

## KAUAI NURSERY.

On February 17, I sent the Forest Nurseryman to Kauai to make arrangements for a new location and the enlargement of our tree nursery at Kalaeo. The old nursery was damaged by the storm and a new site has been chosen, as shown in the current report of the Forest Nurseryman.

## HILO FOREST RESERVE.

Progress has been made in the enlargement of this reserve by securing the approval of the managers of the adjacent plantations. For this purpose Assistant Superintendent of Forestry Kraebel attended a meeting of the managers on February 24, and explained to them the plan which he had prepared. It is hoped to begin the survey of the new boundary as soon as weather conditions will allow of rapid work, probably in May.

## NEW WAIMANALO FOREST RESERVE.

On February 3, I made a visit to Kailua and Waimanalo, Oahu, with Territorial Surveyor W. E. Wall and pointed out to him the proposed boundaries of the new reserve which it is desirable to establish on the mauka sections of these two lands. The boundary survey will soon begin in conjunction with the survey of the Waimanalo beach lots. Fitting in with this project, is the proposed reserve in Maunaloa which the trustees of the Bishop Estate are willing to set aside. On February 17, I pointed out to their surveyor on the ground the area which it is very desirable to protect. This consists of 56 acres in the small valleys at the easternmost limit of the native forest on Oahu near the Waimanalo Pali. This Division, in response to the trustee's request, will prepare a plan for protecting and reforesting the open areas on this new and small but very important forest reserve.

## BIENNIAL REPORT.

Much time was spent during the month in completing the biennial report. This was finally accomplished on February 11.

Respectfully submitted,

C. S. JUDD,  
Superintendent of Forestry.

## REPORT OF THE ASSISTANT SUPERINTENDENT OF FORESTRY, FEBRUARY, 1921.

Honolulu, March 17, 1921.

Superintendent of Forestry, Honolulu, T. H.

Dear Sir:—I respectfully submit the following routine report of my work during the month of February, 1921.

### PALOLO FENCE REPAIRS.

The first week of this month was given to completing, with the aid of Forest Rangers Ellis and Hipple, the repair of the storm-damaged fences in Palolo and the construction of a new type of swinging gate across Palolo Stream. By relocating the fence and gate approximately 470 feet of fence was made to replace the 700 feet which had been destroyed by the January flood.

### TREE PLANTING IN PUPUKEA.

In company with Ranger Ellis, an inspection was made of the cooperative tree planting done in the Pupukea Forest Reserve by the Hawaiian Pine-apple Company and by Harumi, an independent grower. Both plantings were completed on January 1, and were found to be satisfactory.

### NEW TRAIL.

On February 8, I located a short stretch of trail on Round Top above Judd Hillside to replace a very steep and badly built trail which was the only direct connection between Manoa Avenue and the Tantalus auto road. The new trail is on a 20% grade and was constructed during the month by Ranger Ellis.

### STORM DAMAGE ON TANTALUS.

The quarter-acre plantation of Australian red cedar (*Cedrela australis*) on Tantalus, was somewhat damaged during the January storms by wind-falls from the Eucalyptus forest surrounding the cedar. Laborers were put to work cutting out the windfalls and clearing out the black wattle and other undesirable growth from the plot. A few of the cedars were so badly broken that they had to be cut back to the ground, and it is interesting to note that the stumps promptly began to sprout, indicating that the species can be coppiced in Hawaii as well as in its native forests of Australia. While occupied at this work one of the men discovered five cattle in the reserve and drove them to the pound.

### NEW FOREST RESERVE.

On February 18, I assisted the Superintendent of Forestry in determining the boundaries of a new forest reserve in the private land of Maunaloa contiguous to the east boundary of the Kulioou Reserve. The area was surveyed and marked on the same day by a party of surveyors including Mr. Mann, surveyor for the Bishop Estate, owners of Maunaloa, and Mr. Newton, Assistant Territorial Surveyor. On this trip also, in pursuance of the constant effort of the Division of Forestry to accumulate data on the adaptability of exotic trees, several dozen trees were planted in the Kulioou Reserve at an altitude of 1400 feet. The species set out included *Araucaria*, kauri pine, *Brassaia*, *Macadamia*, allspice, lime and koa.

On Sunday, February 20, I went to Waimanalo Landing to accompany the Hawaiian Motors Club on a trip to Manana Island. The trip being



abandoned on account of bad weather, I spent the day exploring the windward beach from Makapuu to Kailua. Numerous driftwood logs of mainland tree species such as Douglas fir, redwood and Port Orford cedar, and many fragments of charred Douglas fir bark were found along the beach, all of which had undoubtedly drifted from the coast states of the mainland.

#### HILO FOREST RESERVE.

On February 23, I left by the "Maūna Kea" for Hilo, returning to Honolulu on the 26, the purpose of this trip being to bring to the consideration of the Hawaii Planters' Association the need of thoroughly protecting the Hilo Forest Reserve. The annual meeting of this association, composed of the Managers of sugar plantations on Hawaii, was held in Hilo on February 24, the following members being present: J. T. Moir, Wm. Pullar, A. A. Scott, Jas. Webster, J. M. Ross, D. M. Forbes, A. Lidgate, F. M. Anderson, Jas. Campsie, Geo. Gibb, and R. Hutehison.

Discussion of the Hilo Reserve focused upon the several recommendations contained in my routine report for December, which I explained at some length, and the sentiment of the Association was strongly in favor of the adequate protection of the reserve. The matter of woodlot planting was favorably considered and a discussion, led by Mr. Forbes, treated the advisability of starting plantations of trees of timber quality for the production of lumber. I told of the work done by the Division of Forestry in raising for this purpose all the seedlings for which seed can be procured of the valuable timber species of Kauri pine, Australian red cedar and the Araucarias.

With regard to using plantation labor to aid in clearing a trail along the line of the boundary survey, the Managers were doubtful that men could be spared at the time the survey is made since plantation activities will be at their height at that time. It was suggested that a crew of Hawaiian boys be formed for this work.

While at Hilo I spent considerable time with Dr. Elliot discussing matters of forest policy relating to the Hilo Reserve and to the forest problem in general of the island of Hawaii.

During the month numerous requests for forestry information from the mainland and from the other islands were answered by letters and by sending the inquirers various publications of the Board.

Respectfully submitted,

CHAS. J. KRAEBEL,  
Assistant Superintendent of Forestry.

#### REPORT OF THE FOREST NURSERYMAN, FEBRUARY, 1921.

Honolulu, March 17, 1921.

Superintendent of Forestry, Honolulu, T. H.

Dear Sir:—I submit herewith a report of the work done during the month of February, 1921:

#### NURSERY.—DISTRIBUTION OF PLANTS.

Sold	650 in transplant boxes,	384 pot grown,	total	1034
Gratis	380 " " " "	464 " " " "		844
(Including forest reserves)				1878

## COLLECTIONS.—GOVERNMENT REALIZATIONS

On account of plants sold .....	\$ 5.95
From Joe Rita, Jr., Kalaheo Nursery, Kauai, Plants sold.....	8.55
Rent of Office Nursery Grounds for January .....	35.00
Total .....	<u>\$49.50</u>

## PRESERVATION OF FOREST RESERVES.

Kokee Camps, Na Pali Forest Reserve, Kauai.	
Rents for Camp Sites No. 1 .....	\$ 5.00
“ “ “ 6 .....	4.00
“ “ “ 17 .....	7.00
“ “ “ 47 .....	7.00
Total .....	<u>\$23.00</u>

## PLANTATION COMPANIES AND OTHER CORPORATIONS.

The number of trees distributed under this heading amounted to 2600 pot grown plants.

## ANIMAL INDUSTRY REVOLVING FUND.

Sale of Vaccine .....	\$94.00
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## MAIKIKI STATION.

The work done at this station consisted of propagating and transplanting, mixing, and sterilizing soil, and attending to the plants in stock.

## HONOLULU WATERSHED.

During the month 774 koa trees were planted on land at the top of the Makiki main valley on the Ewa side. Other work done consisted of clearing off and making holes.

## SUB-NURSERIES.

Hawaii.—Brother Mathias reports that he distributed from the Hilo Nursery 691 trees in transplant boxes.

Maui and Molokai.—Mr. James Lindsay states that he distributed from the Haiku Nursery 5400 plants in seed boxes, 2906 in transplant boxes, and 64 pot grown. Total, 8370.

Kauai.—Joe Rita, Jr., in charge of the Kalaheo Nursery reports that he distributed 981 pot grown plants during the month.

## FOREST RESERVES.

J. K. Luka reports the planting of 2060 koa trees on the Lualualei Forest Reserve.

## ADVICE AND ASSISTANCE.

The writer paid a visit to the Luke Field Aviation Station, and the Marine Barracks, Pearl Harbor, at the request of the Commanding Officers who are anxious to procure a number of trees and other plants for the beautifying of their respective grounds. Advice was also given for laying out and planting the grounds.

The following number of visits were made at the request of people in and around the City:

Calls made .....	9
Advice given by telephone .....	6
People calling .....	7

#### TRIP TO KAUAI.

On February 16, the writer left Honolulu for a visit to Kauai returning on February 20. The visit was made for the purpose of selecting a new site for the Kalaheo Nursery. The old nursery which was located in the bottom of a gulch was washed away during the recent storm. A site was selected close to the homestead road which will be more convenient for people who may want trees and also nearer the area on government lands proposed to be planted in the future. The land around the old nursery site in the Spring Reserve is all planted up, making it necessary to remove the nursery to a more convenient place.

A visit was also made to Grove Farm, where I met Mr. George Wilcox who is as enthusiastic as ever in regard to tree planting. The scarcity of labor of late, however, has been the means of curtailing the planting of trees during the past year. Mr. Wilcox informed me that he was cutting up the *Grevillea robusta* growing around his place and selling the trees for temporary bridges for the new railroad. The surplus ironwood he is also selling for firewood at a good price.

Respectfully submitted,

DAVID HAUGHS,  
Forest Nurseryman.

### DIVISION OF ENTOMOLOGY.

#### REPORT OF THE ACTING ENTOMOLOGIST, FEBRUARY, 1921.

Honolulu, Hawaii, March 15, 1921.

Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—During the month of February the insectary handled 16,700 pupae of the melon fly, from which there were bred 2,793 females and 2,606 males, *Opius fletcheri*.

The distribution of parasites was as follows:

#### MELON FLY PARASITE.

##### *Opius fletcheri*.

	Females	Males
Oahu:		
Nuuanu .....	400	400
Moiliili .....	500	500
Oahu Prison .....	600	600
Pearl City .....	400	350
Moanalua .....	500	500

## FRUIT FLY PARASITES.

*Diachasma tryoni.*

## Oahu:

Punahou .....	550	470
Manoa .....	100	100
Kalihi Valley .....	270	240
Pearl City .....	100	100
Nuuanu .....	200	100

*Diachasma fullawayi.*

## Oahu:

Punahou .....	480	300
Kalihi Valley .....	240	200
Manoa .....	150	100
Pearl City .....	100	100
Nuuanu .....	75	50

*Opius humilis.*

## Oahu:

Punahou .....	150	150
Kalihi Valley .....	100	100

*Dirhinus giffardi.*

## Oahu:

Punahou .....	400
Wyllie Street .....	500

*Galesus silvestri.*

## Oahu:

Punahou .....	550
Wyllie Street .....	700

*Tetrastichus giffardianus.*

## Oahu:

Punahou .....	600
Kalihi Valley .....	200
Nuuanu .....	100

On February 16, Laboratory Assistant Q. C. Chock was sent to 29 Miles, Olaa, Hawaii, to look over the fern weevil situation and dust the infested area with arsenate of lead to destroy the remaining weevils.

He returned on February 20 and reported that he had found a few weevils on ferns in a strip of land between the Cook lot and the Koa Reserve. The infested area was dusted thoroughly with arsenate of lead and to prevent any possible chance of the weevils spreading, a strip of land forty feet wide surrounding the infested area was also dusted. Some time was spent in examining the ferns adjoining the infested area but no weevils were found on them.

Respectfully submitted,

E. M. EHRHORN,  
Acting Entomologist.



## DIVISION OF PLANT INSPECTION.

### REPORT OF THE CHIEF PLANT INSPECTOR, FEBRUARY, 1921.

Honolulu, Hawaii, February 28, 1921.

Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—I herewith submit my report of the work carried on by the Division of Plant Inspection for the month of February, 1921, as follows:

During the month 44 vessels arrived at the Port of Honolulu, 20 of which carried vegetable matter and 9 came by way of Panama. The following disposal was made of the various shipments:

Passed as free from pests .....	1552 lots	31,114 pkgs.
Fumigated with carbonbisulphide...	2 "	2 "
Burned .....	56 "	56 "
Returned .....	3 "	3 "
<hr/>		<hr/>
Total Inspected .....	1613 lots	31,175 pkgs.

Of these shipments 24,383 packages arrived as freight, 136 as baggage and 85 as mail.

### RICE AND BEAN SHIPMENTS.

During the month 13,184 bags of rice and 2567 bags of beans arrived from Japan and were passed as free from pests.

### PESTS INTERCEPTED.

Approximately 1613 pieces of baggage belonging to immigrants from foreign countries were examined from which 34 lots of fruit and 12 lots of vegetables were seized and destroyed. A tabulated list of material intercepted, other than the above mentioned fruits and vegetables follows:

From California:

February 4—1 pkg. Cypress trees, express, returned, twig-borer. (*Argyresthia cupressella*).

From China:

February 1—1 bskt. Bamboo shoots, cargo, burned, prohibited.

From Japan:

February 4—2 pkgs. Green Thuya leaves, baggage, burned, prohibited.

February 14—2 pkgs. Plants, baggage, burned, prohibited.

February 27—2 pkgs. Plants, baggage, burned, prohibited.

February 27—1 pkg. Paddy rice, baggage, burned, prohibited.

February 27—1 pkg. Paddy rice, mail, burned, prohibited.

February 27—1 bag Chestnuts, baggage, fumigated, precautionary.

From Philippine Islands:

February 4—2 pkgs. Paddy rice, mail, burned, prohibited.

February 4—1 pkg. Ficus seed, mail, for Dr. Lyon, fumigated, found *Hemiptera* sp. crawling among seeds.

February 27—1 pkg. Paddy rice, mail, burned, prohibited.

### BENEFICIAL INSECTS.

Following is a summary of the beneficial insects sent by various collectors now in the Orient, received and inspected by me personally. Those sent to the Board of Agriculture and Forestry were also taken to the H. S. P. A.

as per instructions and opened under my supervision in the presence of Mr. Muir where they are being cared for.

Nanking:

February 1—Fig Wasps for *Ficus retusa*, from Fullaway, Hongkong, for Board of Agriculture.

Tenyo Maru:

February 4—Fig Wasps on figs in vials for *Ficus retusa*, from Fullaway, Hongkong, for Board of Agriculture.

Ventura:

February 9—*Pleistodontes froggatti* on Moreton Bay Fig, from Pemberton, Sydney, for H. S. P. A.

Santa Cruz:

February 9—Vial containing *Lycaena* egg parasites from Williams, Manila, for H. S. P. A.

Kiyo Maru:

February 14—Fig Wasps for *Ficus retusa* from Fullaway, Hongkong, for Board of Agriculture. These were all dead, the boy in whose charge they were placed neglecting to put them in cold storage.

### HILO INSPECTION.

Brother M. Newell, Inspector at Hilo, reports the arrival of 6 vessels at Hilo; 4 carried vegetable matter consisting of 125 lots and 3461 parcels, all clean; 1930 bags of rice, 404 bags of beans and 5 bags of peanuts arrived from Japan and were passed.

### KAHULUI INSPECTION.

Mr. Louis Gillin, Inspector at Kahului, reports 6 vessels arriving at Kahului; 2 carried vegetable matter consisting of 13 lots and 1300 parcels; all passed as free from pests.

### INTER ISLAND INSPECTION.

Fifty-five vessels plying between Honolulu and other Island ports were attended and the following shipments passed:

Taro .....	208	bags
Vegetables .....	166	packages
Fruit .....	149	packages
Plants .....	84	packages
Pineapple shoots .....	4875	bags
Seeds .....	11	packages
Total passed .....	5493	packages

Eighteen packages of plants, 2 packages of fruit and 5 packages of sugar cane were rejected on account of infestation, undesirable soil and non-compliance with the regulations.

Respectfully submitted,

E. M. EHRHORN,  
Chief Plant Inspector.

## DIVISION OF ANIMAL INDUSTRY.

### REPORT OF THE TERRITORIAL VETERINARIAN, FEBRUARY, 1921.

Honolulu, March 15, 1921.

Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—I have the honor to submit the following report on the work of the Division for the month of February:

#### TUBERCULOSIS CONTROL.

During the past month a total of 516 head of cattle were tuberculin tested of which number 5 head were condemned, branded and slaughtered, positive lesions of tuberculosis being found in each case.

#### SWINE PLAGUE.

On February 15 I was called by Dr. W. T. Monsarrat to investigate and diagnose an outbreak of disease among swine at the Alexander Young Farm, Kalihi.

Upon arrival I found one hog dead—or dying—which I had killed for diagnostic purposes, and two showing symptoms of commencing sickness.

The post-mortem examination of two carcasses revealed hemorrhagic septicemia with commencing intestinal complications in one case. Vaccination of the remaining animals about two hundred head with mixed infection vaccine; the administration of negro bacillus powder in the feed and thorough cleaning and disinfection of the premises was advised. The recommendations were carried out in a very efficient manner by Dr. Monsarrat with the result that the total loss was confined to the two animals dead at the beginning of the outbreak.

#### HEMORRHAGIC SEPTICEMIA OF CATTLE.

At the request of Mr. George Gibb, manager of Hutchinson Sugar Plant. Co., I left on the S. S. Mauna Kea for Naalehu, Kau, Hawaii taking with me 1750 doses of vaccine and serum for the revaccination of the Kaalualu ranch cattle.

I arrived in Hilo on the morning of February 27 and left the same day with Dr. Elliot for Naalehu and the following morning started vaccinating. In all about 2600 head of cattle were vaccinated and as the supply of vaccine was practically exhausted at the time these were injected, I considered it unnecessary to remain at the ranch longer and so left for Hilo en route to Honolulu.

From the time of the first vaccination in May, 1920, to the time of my arrival, between 100 and 150 head of cattle had been lost and revaccination was deemed advisable. During my stay in Hawaii no cattle were reported lost either on the ranch or on the various homesteads. Since my return Mr. Gibb has recently reported the loss of four head with five more sick, all being cattle vaccinated at the time I was on the ranch.

On March 12 enough vaccine was forwarded to Dr. Elliot to inject 2600 head giving them double the ordinary amount. This, together with what they have already had should produce as high a degree of immunity as it is possible to obtain in connection with this disease.

At best, the period of immunity following vaccination is short, consequently revaccination will have to be practiced for some time and losses among the cattle in this particular district will occur from time to time for a considerable period. Animals sick from the disease or just coming down

with it receive little or no benefit from vaccination which accounts for the deaths reported among the recently vaccinated cattle.

It is my opinion that the poorly nourished condition of the majority of the cattle in this district is mainly contributing to the large number of deaths so far reported since the commencement of the outbreak. At present they are physically unable to resist any infection even of a comparatively mild character. It is entirely probable that as much loss is occurring from the effects of the drought as there is from the disease.

#### EXPERIMENTAL WORK.

A small experiment was started in an attempt to demonstrate the presence or absence of hog cholera on the island of Kauai.

A sample of blood was sent to the laboratory from a case declared by Dr. Golding to be "typical hog cholera." This sample, which arrived in good condition, we had filtered at the Tripler General Hospital, Fort Shafter and the filtrate was used in the inoculation experiments.

On February 19, two young hogs of known susceptibility were injected with varying amounts of the filtered blood. Three to five times the usual amounts were injected so to assure that each received a sufficient amount of the virus if it was there. Since inoculation the pigs have shown no symptoms of hog cholera and have continued to gain weight in a normal manner.

Before any definite conclusions are reached further experiments will have to be made.

Respectfully submitted,

LEONARD N. CASE,  
Territorial Veterinarian.

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#### REPORT OF THE ASSISTANT TERRITORIAL VETERINARIAN, FEBRUARY, 1921.

Honolulu, Hawaii, March 15, 1921.

Territorial Veterinarian, Honolulu, T. H.

Dear Sir:—I beg to submit the following routine report of work done during the month of February, 1921:

#### TUBERCULOSIS CONTROL.

The following cattle were tuberculin tested during the month:

	Tested	Passed	Condemned
John Teixeira .....	5	5	0
C. H. Bellina .....	54	53	1
Chas. Costa .....	6	5	1
Will Young .....	3	3	0
C. W. Lucas .....	44	44	0
Chas. Lucas .....	172	170	2
Chas. R. Frazier .....	1	1	0
M. da Costa .....	3	2	1
M. Salado .....	6	6	0
Kemoo Farm, Ltd. ....	136	136	0
Wahiawa Dairy .....	86	86	0
Total .....	516	511	5

Of the five head condemned, four have been slaughtered and tuberculous lesions found by us in each case. One remains yet to be slaughtered.



## CANINE DISTEMPER TREATMENT.

The following dogs were given vaccine against distemper:

American Railway Express Co. ....	2 Airedales
Dr. F. E. Trotter .....	1 Chow
R. V. Menary .....	1 Collie
C. Dickson .....	2 Chows
B. A. Johnson .....	1 Boston Terrier

## RABIES CONTROL.

The following dogs were given anti-rabies vaccine:

American Railway Express Co. ....	2 Airedales
Dr. F. E. Trotter .....	1 Chow
R. V. Menary .....	1 Collie
Dr. W. T. Monsarrat ....	1 Boston Terrier
Chew Seu .....	1 English Bull
Lt. L. B. Raper .....	1 Fox Terrier
Pearl Harbor .....	1 Mongrel
C. Dickson .....	2 Chows

## IMPORTATIONS OF LIVE STOCK.

Of the twenty-three steamers boarded by me, eleven brought the following live stock to this port:

- S. S. Matsonia, San Francisco: 1 Collie pup, R. V. Menary.
- S. S. Mauna Kea, Hilo: 5 cows, John Teixeira.
- S. S. Lurline, San Francisco: 3 hogs, 2 boxes rabbits, 2 coops chickens, American Railway Express Co.; 1 coop chickens, L. L. McCandless; 36 coops poultry, various; 1 Jersey cow, Chas. R. Frazier; 23 mules, Schuman Carriage Co.; 1 coop chickens, J. A. Scott; 27 coops chickens, Wo Chong.
- S. S. Hyades, Seattle: 5 coops poultry, Chang Bros.
- U. S. A. T. Sheridan, San Francisco: 1 cat, 8th Field Artillery.
- Sampan Leileona, Kaunakakai, Molokai: 2 horses, 3 cows, 7 calves, M. da Costa.
- S. S. Venezuela, Orient: 2 Chow dogs, C. Dickson.
- S. S. Mauna Kea, Hilo: 6 cows, M. Salado.
- S. S. Maui, San Francisco: 2 dogs, American Railway Express Co.
- S. S. Wilhelmina, San Francisco: 65 coops poultry, various.
- S. S. Shinyo Maru, Orient: 4 Game roosters, T. Handa; 1 monkey, M. Morfield.

Respectfully submitted,

L. E. CASE,  
Assistant Territorial Veterinarian.

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By Authority.

## TERRITORY OF HAWAII.

## BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY.

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Further Amendment to Rule I of the Division of Plant Inspection.

The Board of Commissioners of Agriculture and Forestry hereby further amends Section 1 of Rule I of the Division of Plant Inspection, approved

October 25, 1904, amended June 8, 1918, and further amended October 31, 1919, concerning the importation of fresh fruit, etc., from foreign countries, so as to read as follows:

“Section 1. For the purpose of preventing the introduction into the Territory of Hawaii of fruit flies and insects, their eggs, larvae or pupae, and all diseases of plants, fruits, or other vegetation of value, all persons, companies and corporations are hereby prohibited from introducing, importing or bringing, in baggage or otherwise, into the Territory of Hawaii, or into any of its ports for the purpose of debarkation into the said Territory, any fresh fruit from East or West Indies, Asia, Australasia, Oceanica, Malaysia, Mexico, Central and South America; provided, however, that fresh apples and pears may be imported into the Territory of Hawaii direct from New Zealand in cold storage only, if they are free from insect pests and plant diseases, and are accompanied by a government certificate declaring that the apples and pears have been grown in New Zealand and are shipped free from insect pests and plant diseases, and are also accompanied by a government certificate declaring that they have not and will not come in contact with Australian grown fruit on the voyage to the Territory of Hawaii.”

This amendment shall take effect upon its approval by the Governor.

Adopted on March 23, 1921, by the Board of Agriculture and Forestry.

A. L. C. ATKINSON,  
President

Approved this 24th day of March, 1921.

C. J. McCARTHY,  
Governor of Hawaii.

Honolulu, T. H.

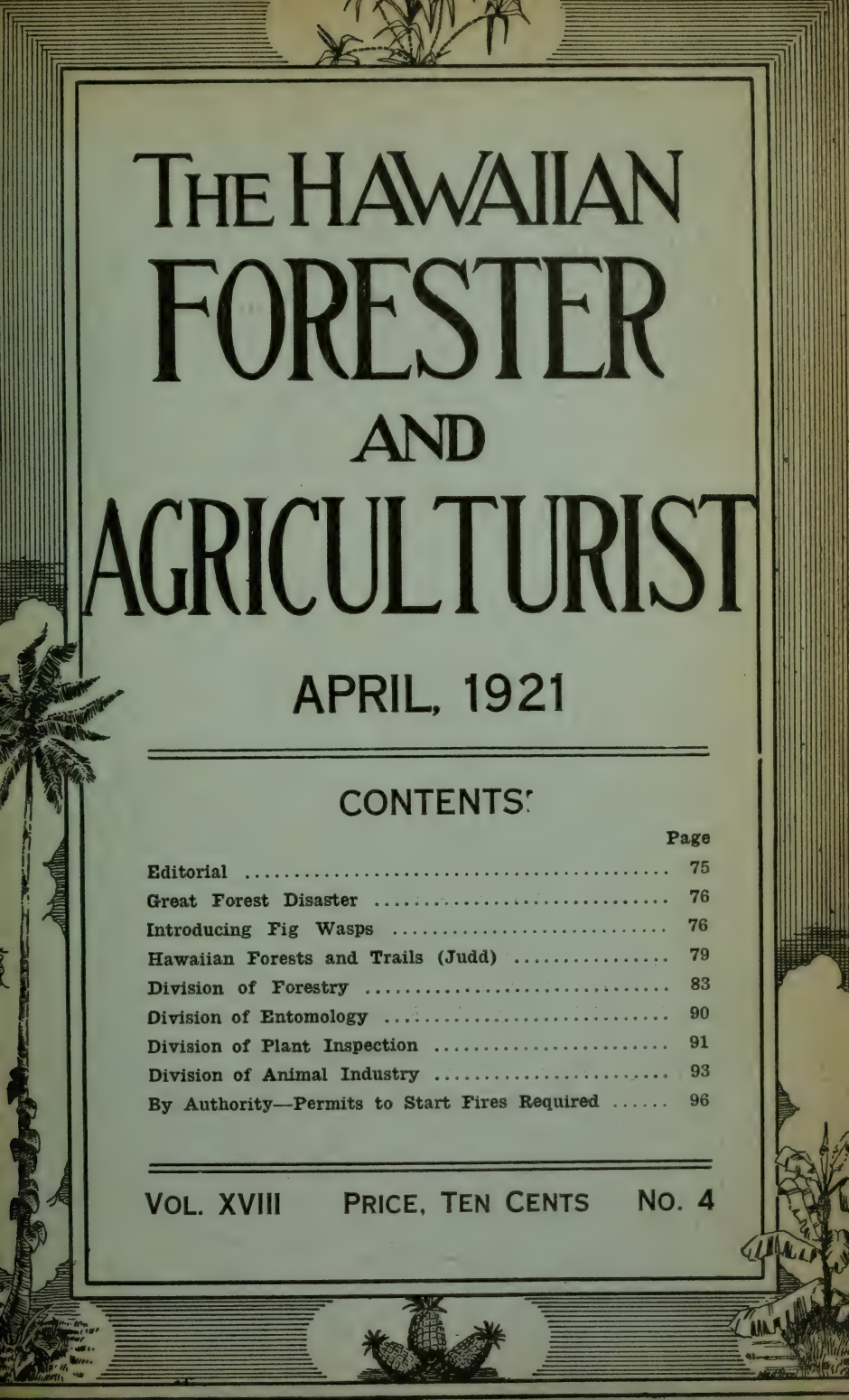












# THE HAWAIIAN FORESTER AND AGRICULTURIST

APRIL, 1921

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(1921)

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W. M. Giffard,

H. M. von Holt,

A. H. Rice

C. S. Judd, *Executive Officer.*

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Charles J. Kraebel, *Assistant Superintendent of Forestry.*

David Haughs, *Forest Nurseryman.*

Joseph F. Rock, *Consulting Botanist.*

Bro. Matthias Newell, *in charge of Sub-Nursery at Hilo, Hawaii.*

Joe Rita, *in charge of Sub-Nursery at Kalaheo, Kauai.*

David Kapihe, *Forest Ranger for Tantalus, Oahu.*

E. H. Hipple, *Forest Ranger for Palolo, Manoa, and Nuuanu, Oahu.*

Daniel Kapahu, *Forest Ranger for Waianae, Oahu.*

J. P. Pico, *Forest Ranger for Waiakea-kai Reserve, Oahu.*

Hosea K. Lovell, *Forest Ranger for Kauai.*

A. J. W. Mackenzie, *Forest Ranger for Hawaii.*

James Lindsay, *Forest Ranger for Maui, and in charge of Sub-Nursery at Haiku.*

Antone P. Aguiar, *Forest Ranger for Panaewa Reserve, Hawaii.*

Charles E. Stone, *Forest Ranger for Kau and South Kona, Hawaii.*

Harry L. Denison, *Forest Ranger for Kohala Mt. and Hamakua Pali Reserve, Hawaii.*

V. L. Ellis, *Forest Ranger at Large.*

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Quan Chew, *Laboratory Assistant.*

Rodrigo Villafior, *Insectary Assistant.*

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L. A. Whitney, *Assistant Plant Quarantine Inspector and Laboratory Assistant.*

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Louis Gillin, *Fruit and Plant Inspector, Kahului, Maui.*

E. E. Madden, *Honorary Plant Inspector at Mahukona, Hawaii.*

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Miss Florence A. White, *Librarian and Stenographer.*

# THE HAWAIIAN FORESTER AND AGRICULTURIST

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No. 4

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Restrictions placed by the Board on the introduction of fig wasps from foreign countries are set forth in this issue.

A formal notice requiring permits to start fires on any lands in East Hawaii until the end of the present calendar year appears in this issue.

Attention is called to the description in the last issue of the initiation of an experiment in Nuuanu Valley to reclaim land occupied exclusively by Hilo grass.

Active progress is being made in fencing forest reserve boundaries, as will be seen by the March report of the Superintendent of Forestry printed in this number.

The desirability and necessity of protecting our susceptible native forest from all forms of damage are concisely set forth in an article on Hawaiian forests and trails contained in this issue.

The plan of the Outdoor Circle to combine with the city utility companies in employing a city forester to care for street trees is a step in the right direction and should result in making Honolulu more beautiful.

New seed introductions during March consisted of a new chaulmoogra oil tree (*Hydnocarpus castanea*) from the Martaban Hills in Burma, and the Moreton Bay fig (*Ficus macrophylla*) from Sydney, Australia.

Among other trees set out during March, the Division of Forestry planted 2,046 koa trees in the Waianae Mountains. In a few years, visitors to Kolekole Pass will gaze upon new koa groves instead of upon bare and washed hillsides as at present.

The members of the Legislature who visted the Waianae-Kai Forest Reserve on March 6, were very strongly impressed with the wonderful results of forest protection which they viewed in the form of a dense forest cover and running streams of pure mountain water on lands that less than a quarter of a century ago were bare.

## GREAT FOREST DISASTER.

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There is every reason to believe that the recent windfall disaster on the Olympic Peninsula in the State of Washington was the most extensive and destructive of any which has occurred in the forests of America for several centuries.

A tremendous tornado on January 29, 1921, blew down eight billion board feet of timber. A wind velocity of 132 miles an hour was recorded at the weather station near the mouth of the Columbia River and the observer estimates that after the storm destroyed his instruments the wind increased in strength to 150 miles an hour.

The wind-thrown timber which lies in a tangled mass over an area of 2,250 square miles constitutes the greatest fire trap known in the history of the United States and consists largely of western hemlock and spruce, both of which are subject to rapid decay. Transportation is lacking for much of this region and it is doubtful whether any considerable proportion of the timber can be salvaged.

Where the full force of the wind was felt practically every tree was thrown down and all roads, trails, and telephone lines were completely obliterated.

Winds that blow down some timber are common every few years, but violent storms like this one on the Olympic Peninsula with the attendant destruction of timber are in the nature of a catastrophe like earthquakes and volcanic eruptions which fortunately occur only infrequently.

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## INTRODUCING FIG WASPS.

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Restrictions on the extent to which wasps, which fertilize the seed of *Ficus* trees, should be introduced into this Territory were recommended to the Board of Agriculture and Forestry in the following letter:

Honolulu, March 2, 1921.

Board of Commissioners of  
Agriculture and Forestry,  
Honolulu.

Gentlemen:

During my absence from the Territory the Board passed the following resolution at a meeting held on September 9, 1920:

"Whereas, the forests of the Hawaiian Islands are being depleted, due mainly to the ravages of stock, and it is nec-



essary in many districts to reforest in order to conserve the rainfall for purposes of irrigation; and

"Whereas, certain trees of the genus *Ficus* are considered suitable for purposes of reforestation, and should give results in an appreciably short time providing means are found to insure their spread by natural agencies;

"Therefore, Be It Resolved by the Board of Agriculture that the plan proposed by the Hawaiian Sugar Planters' Experiment Station to investigate the role of chalcid flies commonly known as fig wasps in the fertilization of the seed of certain species of *Ficus* with the intent of introducing one or more species of the said fig wasps into the Hawaiian Islands is, after due consideration of the views and opinions of the various naturalists consulted and heard from, approved, and the Chief Plant Inspector is hereby authorized and directed to permit the introduction of said insects under the usual guarantees as to safety from harmful consequences."

At that time, the "certain trees of the genus *Ficus*" and the "certain species of *Ficus*," as set forth in the above resolution, were not defined by the Board and it is the purpose of this letter to present my decision, as Superintendent of Forestry in direct charge of government lands in the forest reserves of the Territory, as to what species of *Ficus* the introduction of fertilizing wasps should be limited to for the present and to ask your final approval of this list.

After conferring with representatives of the Honolulu Sugar Planters' Association, I believe that for the present the introduction of wasps should be limited to those which fertilize the following five species of trees:

- |                              |                    |
|------------------------------|--------------------|
| 1. <i>Ficus</i> Benjaminia.  | Benjamin fig.      |
| 2. <i>Ficus</i> elastica.    | Indian caoutchouc. |
| 3. <i>Ficus</i> macrophylla. | Moreton Bay fig.   |
| 4. <i>Ficus</i> religiosa.   | Peepul tree.       |
| 5. <i>Ficus</i> retusa.      | Chinese banyan.    |

Good specimens of these five different kinds of trees are growing in these islands and in the interests of our native forests it is believed that the experiment of introducing wasps so as to bring about the production locally of fertile seed should be limited for the present to these five trees.

The Benjamin fig from India and the Malay Peninsula is quite similar to the Chinese banyan of Malasia but has more pendulous branches and yellow fruit.

The Indian caoutchouc is the familiar rubber tree, of New England bay window fame, from India and tropical Asia and produces commercial rubber.

The Moreton Bay fig comes from Australia and seems to be closely allied to the Lord Howe Island fig (*F. columnaris*), of

which the latter is perhaps only a variety, and to the Fort Jackson fig (*F. rubiginosa*). Contrary to the usual belief, it is likely that one wasp may fertilize two of these trees on account of their close alliance and similarity of fruit structure, but since the trees have similar habits one would be as good as another for use here. Of the Moreton Bay fig, Dr. J. H. Maiden, the world-famous botanist of Australia, says that no other Australian tree could be more suitable for reforestation work in Hawaii. He claims that it is exceedingly hardy, thrives in very rocky, shallow soils, stands no end of abuse by cutting, etc., and resists winds and hurricanes splendidly and adds that the seed is readily taken by birds but that he has never observed the seed germinating on the roofs of dwellings or otherwise appearing in undesirable places.

The Peepul tree is the tree in India held sacred both by Hindus and Buddhists and lives to a great age.

Since the project of introducing seed fertilizing wasps on the *Ficus* is an experiment, the final outcome of which no one at the present time is able to foretell, it seems wise to me to limit it for the present to these five species.

On account of the recent discovery that one wasp may fertilize the seed of more than one species of *Ficus*, the entomologists in the field should be cautioned to study the habits of approved wasps intended for shipment to Hawaii before they are introduced here to make sure that none of them will fertilize the seed of any other species of *Ficus* which would not be a distinct addition to the Hawaiian forest flora.

I, therefore, recommend:

1. That for the present the introduction of fertilizing wasps be restricted to those which perform only on *Ficus Benjamina*, *elastica*, *macrophylla*, *religiosa* and *retusa*.

2. That the Chief Plant Inspector be instructed to allow the introduction of wasps fertilizing the seed of only these five species.

3. That the entomologist now engaged in this project be informed at once of this limitation and be requested to study the habits of wasps in the field and to send none which will fertilize the seed of any of these five species and other species of *Ficus* which will not be a distinct addition to the present Hawaiian forest flora.

Respectfully submitted,

C. S. JUDD  
Executive Officer and  
Superintendent of Forestry.

With the foregoing as a basis, the Board at a regular meeting held on March 4, 1921, passed the following motion:

"It was moved and unanimously carried that the cooperative work of this Board with the Hawaiian Sugar Planters' Association concerning the latter's desire to introduce fig wasps for the fertilization of certain species of *Ficus* trees be restricted to the following: viz., those which fertilize only *Ficus Benjamina*, *elastica*, *macrophylla*, *religiosa* and *retusa*. Also that the Chief Plant Inspector be instructed to restrict, in so far as he may, the introduction of such wasps to those which fertilize the seed of only these five species, and that the Entomologists now abroad engaged in this work be at once informed as to the limitation given above and that they be requested to study, when at all possible, the habits of these wasps in the field before sending material to Hawaiian Territory."

C. S. J.

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## HAWAIIAN FORESTS AND TRAILS.

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By C. S. JUDD, *Superintendent of Forestry.*

The chief product of the native Hawaiian forest in the mountainous sections of the islands, particularly on the windward side, is water. These forests are valued not for the timber which they produce but for the very appreciable influence, of a beneficial nature, which they exert on the run off, not only by conserving the rainfall after it has left the moisture-bearing clouds but also by preventing the scouring effects of a rapid run off, commonly called erosion.

The population in these islands will increase up to a certain limit. There are those who assert that Honolulu will expand very largely within the next twenty-five years and that the residence section will be pushed out far beyond Kaimuki and that before very long a suburban trolley line will be bringing people into this city for their daily labors from as far east as Kuliouou. This expansion will take place until terminated by some limitation. The limitation will not be the lack of land area due to the complete occupation of the soil, for we can always build up into the sky, but it will be imposed upon the community by the amount of water available for its domestic uses.

Periodically, at the height of the dry season, we read in the papers of the need of a greater water supply. A commission is appointed to report on the subject or an expert is employed to discover a new supply of underground waters. Irrigation hours are limited but the slogan "Something must be done" is forgotten as soon as the rains come again and we are able once more to fill the tub for our morning bath.

As the population increases, however, the shoe will pinch all



the tighter and there will be a real need for every drop of water that can be conserved from the rainfall.

With such a situation before us in the near future, it behooves us to take every precaution now to guard our depleted forests so that they will function to their highest capacity in conserving the rainfall and it is the duty of every good citizen to help in this most important work.

Already our native forests have, by the destructive results of fire, grazing animals, and man, been pushed so far back up the steeper mountain slopes that they now conserve water on only a portion of the catchment areas which should be serving the population as water producers. Moreover, the forest on this reduced area, owing to these deleterious influences, is not in the healthiest of conditions.

It is necessary, therefore, that what little remains of the native forest on our important water-producing areas of the steeper mountains, must, if not for the sake of the present population, then for the future inhabitants of these islands, be most zealously and carefully guarded. Not only must the injury done to the forest be repaired by artificial and natural means but every step must be taken to head off and prevent further damage from whatsoever cause.

The nature of the indigenous forest is familiar to all who have ever delighted in tramping through it and even the casual observer is familiar with the far-reaching damage which usually results from trivial injury. The removal of the undergrowth of delicate ferns and other succulent plants which causes the drying out of the shallow-rooting system of the trees and results in their gradual decline and death and the concomitant opening of the forest to the invasion of injurious insects, fungi and exclusive grasses is a phenomenon which you have seen only too often.

The fact that the balance of nature in our native forest is so delicately poised and is so easily tipped in the wrong direction is well enough known by those who have been long residents in these islands but is not so apparent to those who have lived here only a short time.

The duty of those who by law are required "to devise ways and means of protecting, extending, increasing and utilizing the forests and forest reserves, more particularly for protecting and developing the springs, streams and sources of water supply, so as to increase and make such water supply available for use" is to maintain the native forest as nearly as possible in its primitive condition. My predecessor was convinced and I am of the same opinion that "To get the best results from the water bearing forests in Hawaii in the way of steady and continuous yields, it is in many localities essential that both animals and men be rigorously excluded." This is done on the watersheds of mainland cities and is the accepted practice.



Fortunately the fire menace in our water producing forests is practically nil, except after extended droughts. The dumb beast must be excluded from the forest by erecting barriers on the reserve boundaries beyond which he must not pass. Only yesterday, the Legislature, cognizant of the damage done to the forest by marauding stock and recognizing the benefits to be derived from absolute forest protection, on its closing day of the session passed a new law giving the Division of Forestry greater authority for the removal of stock from forest reserves.

Wilful and intentional damage to the forest by man is so easy of detection that it plays only a very small part in the matter of forest protection. It is the unintentional damage done by man in utter innocence which results in far greater damage to the native forest. The carrying into the forest of seeds of vigorous weeds and introduced grasses, which have the ability to spread with great detriment of the native forest cover on the leggings, shoes, and other clothing of trampers, may and often does result in damage to the forest which vastly outweighs the pleasure which the trampers may gain from their outing.

This damage is absolutely unintentional on the part of the individual but is none the less real. It may be minimized, however, by confining one's itinerary to the ridges where the ancient Hawaiians found the best going in the mountainous country and by avoiding the construction of cut trails. The seed of these deleterious grasses sprout more readily where the soil is exposed. Hence, the grading of a trail through a native forest and preparing the soil for the reception of seed of a destructive grass, which is inevitably bound to be brought in by pedestrians, is about the harshest treatment that can be given a water-catchment forest area. Moreover, a side hill trail cut in soft rock, particularly if ample provision is not made for drainage, often becomes the starting point for land slips that not only destroy the trail itself, but do damage as well to the forest on the steep slopes below.

No one is fonder of tramping in our steep mountain wet forests than I, but I so fear the unintentional damage which I may do by carrying in grass seed which may sprout with detriment to the forest that I consider such forests sacred ground and enter them only when duty calls me there.

To my mind the foothill regions and the open drier mountains, where the wet native forest is absent, offer far more allurements and attractions to the tramper. Here are found no tangling masses of staghorn fern to clutch at your wayward feet or to be burrowed under when they overtop your head; here no jungles of ie-ie vine retard your progress or offer a helping but treacherous hand hold on the steep palis; and here no wet forests keep you chilled with damp clothing or obscure the unsurpassed view for hours at a stretch.

The foothills and mountain spurs offer an itinerary for the

shorter excursions to which the busy office worker is confined for lack of sufficient time while, for the all-day tramp, a score of magnificent trips are available in regions where there is no danger of doing unwitting damage to the forest.

Who has not climbed the escarpment back of Mokuleia and Kawaihapai toward the west end of the island and not felt rewarded when he gained the top and then strolled more leisurely toward the summit of the range in the grateful shade of the kukuis which fill the gentle sloping gulches like cathedral arches, or been thrilled when he came suddenly upon a boulder-strewn knoll covered with an open grove of yellow ohia lehua in full blossom, or felt inspired by the grandeur of the birds-eye view, from the main ridge, of Makua and Kahanahaiki Valleys spreading out at your feet an expanse of cliffs, slopes, cultivated patches, the dazzling brightness of the coral beach, and the blue of ocean depths reaching far out to the horizon?

Who has not gone into this same plateau region a second time during the nalu season and been enveloped in the dense fog and not felt the thrill of adventure while seeking for one of the few trails down the cliffs to the Kaena lowlands, with the obscured surf below booming in his ears?

Who has not labored up the craggy ridge in Halona almost to the top of Puu Kaua and not felt amply rewarded by the sudden glimpse through Pohakea Pass in the Waianae of Diamond Head with the placid waters of Pearl Harbor winding like a broad river through the kiawe forest to the sea? Or who has not rambled up the rocky ridges mauka of Koko Head and enjoyed the expansive view of barren ridge after ridge stretched before him toward the desert end of the island, to be cooled at last in the strong trade wind blowing over the crest of Waimanalo Pali and felt amply rewarded with the view to windward of the unsurpassed beach, the coral patches showing through the crystal clear waters, the fringe of dazzling surf surrounding Rabbit Island, Makapuu Point boldly facing the broad swells of the open Pacific, with the white beach of west Molokai and the jutting headlands back of Kalaupapa framing the picture on the right?

These are only a few of the many fascinating and alluring tramps in the open country on the island of Oahu which one may take with the absolute assurance that he is interfering with no scheme of forest protection or endangering the continuity of the valued water supply.

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Note: The foregoing paper was delivered at a regularly assembled luncheon meeting of the Hawaiian Trail and Mountain Club on April 28, 1921, at which time the Club unanimously voted to plan its excursions so as to interfere as little as possible with forest protection.—Ed.

## DIVISION OF FORESTRY.

REPORT OF THE SUPERINTENDENT OF FORESTRY,  
MARCH, 1921.

Honolulu, Hawaii, March 31, 1921.

Board of Commissioners of Agriculture and Forestry,  
Honolulu, T. H.

Gentlemen:

I respectfully submit the following report of the Division of Forestry for the month of March, 1921:

## TREE PLANTING.

During the month 2,046 koa and 1,357 ironbark (*Eucalyptus crebra*) were planted at Mikilua in the Lualualei Reserve, 220 koa and 30 Australian red cedar (*Cedrela australis*) on Tantalus in the Honolulu Watershed Forest Reserve, Oahu, and 14 miscellaneous trees at Polipoli in the Kula Forest Reserve on Maui; total, 3,667 trees.

On March 21, 200 seeds of the chaulmoogra oil tree (*Hydnocarpus castanea*) were received through the Hawaiian Sugar Planters' Association from Mr. J. F. Rock. These came from the Martaban Hills near Maulmain in Lower Burma and were planted at once in our nursery.

On March 26, approximately 8 pounds of seed of the Moreton Bay fig (*Ficus macrophylla*) received through the Hawaiian Sugar Planters' Association from Mr. C. E. Pemberton at Sydney were broadcasted in the forest reserve at Hauula, Oahu, in the effort to determine whether this method of propagation is feasible and will produce any positive results.

The Forest Nurseryman has been requested to supply missing labels for the trees in the arboretum at the Government Nursery on King Street so that the trees in this interesting collection may be more readily identified by visitors.

## FOREST FENCING.

Work on eight fencing projects was continued or initiated during the month as follows:

1. Kealia Forest Reserve, Kauai. Ranger Lovell repaired an aggregate of 523 feet of boundary fence in places where the storm had weakened it.

2. Lualualei and Makua-Keaau Forest Reserves, Oahu. During the month a total of 600 feet of fence was repaired on the boundaries of these two reserves. This work consisted of resetting loose posts and placing more spreaders on the wires and was performed by a laborer from the Mikilua Nursery. Ranger Kapahu, who resigned on March 1, had not kept up this work properly and had allowed the fences to remain in a weakened condition. I have instructed one of the nursery laborers to ride the fences two days each week so as to keep them in good stock-proof condition.

3. Hauula Forest Reserve, Oahu. As a result of a complaint made to the Commissioner of Public Lands, the fence on the boundary of the government land in this reserve was repaired during the month. Approximately 1,500 feet received attention, the work consisting chiefly of replacing hau with redwood posts and reconstructing the water gates in the gulch bottoms.

4. Kula Forest Reserve, Maui. Ranger Ellis continued with the work of closing up the gap between Kanahau and Kalepeamo, 4,332 feet in



length, on the mauka boundary of this reserve. The work, at an elevation of 8,000 feet, has been performed under many difficulties which Ranger Ellis has been able to overcome. American fencing 58 inches high has been used for the larger part of the fence but in the most exposed situation stones are being used for the fence.

5. Koolau Forest Reserve, Maui. The repairing of the boundary fence back of the old Nahiku homesteads, which is being done by three laborers, continued during the month and approximately one mile received attention. The wire is being replaced in parts and some new posts are being set so as to strengthen the fence.

6. Olaa Forest Park Reserve, Section C, Hawaii. Ranger Mackenzie has strengthened the boundary fence on parts of this reserve in the boggy country near Glenwood by adding 100 new posts.

7. Olaa Forest Park Reserve, Section C, Hawaii. The work of constructing a new fence along the Volcano Road to protect the reserved strips between 19 and 22 Miles is nearing completion. The work is being done by Y. Tanaka and the wire supplied by this Division. The total length of the fence is 2.52 miles.

8. Honuaula Forest Reserve, Hawaii. On March 19, the reconstruction of the fence on the mauka boundary of this reserve, involving a distance of 1.6 miles, was completed. This Division worked on this project in co-operation with the ranch manager of the John A. Maguire Estate and the Greenwell Ranch. The fence which had suffered from storm damage was thoroughly repaired and made sheep-proof on the mauka side. A joint drive resulted in the removal of practically all stock from the reserve. The managers of these two ranches have mutually decided to shoot any remaining stock which may be found in the reserve and which cannot be driven out.

#### FOREST PROTECTION.

On March 6, the President and officials of this Division accompanied twenty-five members of the Legislature on a visit to the Waianae-Kai Forest Reserve where the beneficial results obtained by forest protection in relation to water conservation were forcibly demonstrated.

Twenty new standard forest reserve monuments were ordered during the month for use in the demarcation of the new Waimanalo Forest Reserve and on unmarked corners of established reserves.

#### FOREST FIRES.

The following two forest fires were reported during the month: **March 7, 1921.** Wahiawa, Oahu. At 7 o'clock p. m. District Fire Warden A. A. Wilson reported a fire of unknown origin on the ridge between the Poamoho and the north fork of the Kaukonahua Streams. The fire started at 2 o'clock p. m. but was extinguished by nightfall the same day with the aid of 200 laborers of the Hawaiian Pineapple Company at a cost of \$200. Approximately 50 acres of ground was burned over, 75 per cent of which was covered with trees and ferns and the balance with Hilo grass. Although two individuals were seen coming away from the burning area, it was not possible to secure any evidence which would lead to the conviction of the person who started the fire.

**March 13-17, 1921.** Punahoa 2 and Piihonua, Hawaii. District Fire Warden James Henderson reported a fire which started at 9 o'clock a. m. on March 13, on pasture land, in Kaumana two miles back of Hilo, and burned over approximately 150 acres of mostly grass land and new tree growth on the 1881 lava flow before it was extinguished on March 17. The bill for labor in extinguishing this fire, furnished by the Hilo Sugar Company and the Hawaii Mill Company, amounted to \$778.25. The fire originated from the burning of pasture land by J. E. Gamalielson at a time when there had been no rain for ten days. The setting of a fire at such



a dangerous time was considered to be negligence and the District Fire Warden was instructed to present all of the facts to the County Attorney with the request that, if in his judgment the evidence was sufficient, a charge be brought against Mr. Gamalielson for violation of Section 496, R. L. H. 1915. This was done and on April 11, Mr. Gamalielson pleaded guilty to the charge and was given a suspended sentence of 13 months.

Publicity was given to this case in the effort to prevent similar occurrences in the future. In addition to this, the provisions of Section 497, requiring permits to start fires for the period from May 1, to December 31, 1921, in the region in East Hawaii from Waipio Valley to Kau, were put into effect by the publishing of the attached "By Authority" notice in five Hilo newspapers.

#### CITY FORESTER.

At the request of the Outdoor Circle, which has made an arrangement with the utility companies having wires on the public streets of Honolulu for the employment of an expert who will be charged with the duty of taking better care of the street trees of this city, I communicated on March 22 with the Forester at Washington, D. C., and asked him to send me the name and qualifications of the best trained man who could fill this new position in a competent manner. The Forester has replied that he will comply with the request to the best of his ability.

#### RECLAIMING GRASSLAND.

On March 17 an experiment was initiated in the Honolulu Watershed Forest Reserve in Nuuanu Valley below Luakaha to determine whether areas covered with Hilo grass (*Paspalum conjugatum*) may readily be replaced by a growth of haole koa (*Leucaena glauca*). The experiment has been described in detail in the March "Forester" and consists, in brief, of nine plots each one-hundredths of an acre in size. Three of these were left untreated as check plots, three were denuded of the grass by burning, and three were burned and plowed. On the plots thus treated seed of the haole koa was sown broadcast in proper series at the rate of 10, 20, and 30 pounds per acre. If positive results are secured from this experiment, which will have to run for at least two years, steps can then be taken to reclaim larger areas which are at present dispossessed of forest growth by this pernicious introduced grass.

#### FUEL VALUE OF ALGAROA WOOD.

On March 29, I shipped to the Forest Products Laboratory of the U. S. Forest Service at Madison, Wisconsin, four samples, each 2x2x6 inches in size, of algaroba wood (*Prosopis juliflora*) so that they could be tested for specific gravity and calorific power. The assistant director of this laboratory very kindly offered to make the tests the results of which are needed to answer questions frequently received in this office concerning the fuel value of this valuable wood.

Respectfully submitted,

C. S. JUDD,  
Superintendent of Forestry.

# REPORT OF THE ASSISTANT SUPERINTENDENT OF FORESTRY, MARCH, 1921.

Honolulu, Hawaii, March 31, 1921.

Superintendent of Forestry,  
Honolulu, T. H.

Dear Sir:

I respectfully submit the following statement of my activities during the month of March, 1921. The entire month was spent on the island of Oahu, either in the office or on various field trips.

## MAPS AND HERBARIUM.

Several days were devoted to a thorough overhauling of the file of forest reserve maps, and thus far one complete set of blueprint maps of the reserves on Oahu has been assembled and mounted in loose-leaf book covers for ready reference. It is planned to mount in this manner a complete set of maps of all forest reserves in the territory as one step in the preparation of a complete working plan for all territorial forest reserves.

A number of additions were made during the month to the office collection of herbarium specimens of forest trees, including both native and imported genera.

## IPIL-IPIL VERSUS HILO GRASS.

In company with the Superintendent I spent two days in upper Nuuanu Valley initiating an experiment to determine the efficacy of ipil-ipil in overcoming Hilo grass. Ipil-ipil or haole koa (*Leucaena glauca*) is a small tree, native of tropical America, which is used effectively in the Philippines to kill out cogon grass. In our experiment the seed was sown broadcast in various quantities over measured plots in which the surface had been variously prepared, viz., grass undisturbed, grass burned, soil plowed after removal of grass. The effort will be to obtain a sufficient catch of ipil-ipil to shade out completely the Hilo grass. Of the adaptability of the tree there is no question, for it is already vigorously established in Makiki Valley and in many other places in the islands where it is commonly known as "Koa haole" or white man's koa, from the fact that its foliage and seed-pods somewhat resemble those of the true koa. In Hawaii it is a very prolific seeder and spreads rapidly by natural reproduction.

## REFORESTATION DEMONSTRATIONS.

On March 6 I accompanied the official party of some twenty members of the Legislature, headed by President Atkinson of the Board, and the Superintendent of Forestry, on a visit to the Waianae-kai Forest Reserve, Oahu. Here were demonstrated the benefits in the way of steady stream flow obtained by the sugar plantation in the Waianae Valley as a result of the rigid forest protection and extensive forest planting carried on for a number of years in the foothills above the plantation.

On the 9th, Mr. William Crosby, forester in the Philippine service, en route to the mainland, stopped a day in Honolulu. I took him over the Round Top-Tantalus Drive to see the planted Koa and Eucalyptus forests and the Makiki Nursery, then up Nuuanu Valley to the ipil-ipil plots and other places of interest. He was surprised and very favorably impressed with the extent of the work in forestry being done here.

## HONOULIULI.

A trip was made to Kunia on March 8 to recover a number of boundary pipe markers which were sent there during Mr. Hosmer's administration for the purpose of monumenting the then proposed Honouliuli Reserve. This reserve, however, has never been proclaimed, and the fifty-four pipes, collected by the local luna of the Libby plantations, were brought back to Honolulu to be used wherever needed on other reserves. The vicinity of Kunia, where a few years ago stood a thrifty eucalyptus forest planted by Mr. A. W. Van Valkenberg, is now given over entirely to pineapple culture. Nothing remains of the former forest but two rows of trees sheltering the laborers' camps and a pile containing several thousand cords of firewood.

## WAHIAWA FIRE TRESPASS.

On March 10 an inspection was made, in company with Dr. Lyon and Mr. MacEldowny, of the area recently burned in Wahiawa at the edge of the Ewa Reserve. Two small gulches were included in the burn comprising some fifty acres, and it is likely that most of the forest growth of koa, kukui and tree fern will die as a result of the fire. I took several photographs of the area and scattered seeds of the following species: California big tree, African tulip or flame tree, Hawaii koa, and silk oak. Since the ground in many places was burned quite bare it is hardly probable that natural reproduction will occur to any great extent, although the removal of overhead shade might stimulate the native koa seed which is stored in the ground. It was apparent that the fire had started in one of the gulches and swept up the surrounding slopes to the edge of the plateau where it was stopped; but nothing could be learned of how it started.

## TIMBER MARKING.

On March 11, at the request of Mr. O. St. John Gilbert, I marked for cutting several acres of algaroba forest on government land in Nanakuli Valley covered by a general lease from the Land Office. Trees to be left standing were blazed and stamped at breast height and at the ground, the spacing of marked trees being from 30 to 40 feet. Marking was done with a view to leaving trees which seemed to promise the highest production of beans and honey, the unmarked trees being cut into firewood by Japanese laborers in Mr. Gilbert's employ. It is expected that the thinning will result in accelerated growth of the remaining trees with a consequent increase in blossom and bean production.

## HAUULA FOREST RESERVE.

In company with the Superintendent I made a trip to the windward side of Oahu on March 25 and 26. On this occasion several pounds of seed of the Moreton Bay fig (*Ficus macrophylla*) were sown broadcast in a valley of the Hauula Forest Reserve, also where the forest reserve boundary fence was inspected.

## KALIHI VALLEY.

One day was spent in Kalihi Valley in an effort to locate some of the Australian wallabies which were reported to be multiplying rapidly in the upper valley. No sign of wallabies was found, but the condition of the upper valley, from the standpoint of forestry, was found to be very bad as a result of unrestricted grazing. A memorandum covering this phase of the situation has been prepared.

Respectfully submitted,

C. J. KRAEBEL,  
Assistant Superintendent of Forestry.

**REPORT OF THE FOREST NURSERYMAN, MARCH, 1921.**

Honolulu, Hawaii, March 31, 1921.

Superintendent of Forestry,  
Honolulu, T. H.

Dear Sir:

I herewith submit a report of the work done during the month of March:

**NURSERY—DISTRIBUTION OF PLANTS.**

	In seed boxes.	In transplant boxes.	Pot grown.	Total
Sold .....		400	32	432
Others .....	1,000	150	277	1,427
Total .....	1,000	550	309	1,859

**COLLECTIONS—GOVERNMENT REALIZATIONS.**

Sale of plants, Government Nursery, Honolulu .....	\$ 4.80
Rent of Office Nursery Grounds for February .....	35.00
Sale of plants, Kalaheo Nursery, Kauai .....	14.00
Total .....	\$53.80

**PRESERVATION FOREST RESERVE.****CAMP SITES KOKEE CAMPS. NA PALI, KAUAI.**

Fee for Camp Site No. 27, January 1 to December 31, 1921 ....	\$ 7.00
Fee for premises at Halfway House, Tantalus, for quarter ending March 31, 1921 .....	30.00
Fee for permit to cut and use Hilo grass from land in Nuuanu Valley below Lauakaha to June 30, 1921 .....	1.00
Sale of 133 loads black sand taken from Makiki Valley sand pit, at 50 cents per load .....	66.50
Total .....	\$104.50

**ANIMAL INDUSTRY REVOLVING FUND.**

Sale of vaccine .....	\$1,544.50
-----------------------	------------

**PLANTATION COMPANIES, ETC.**

75 pot-grown trees were distributed during the month.

**MAKIKI STATION.**

The work done at this station consisted of the usual routine. We have on hand a quantity of mahogany, Australian red cedar, koa, Bermuda juniper, Cook's araucaria, ironwood, Eucalyptus robusta, Macademia nut and a quantity of other species in smaller numbers.

**HONOLULU WATERSHED.**

Trees planted during the month amounted to 220 koa and 30 Australian red cedar. Other work done consisted of clearing off and making holes.



## LUALUALEI RESERVE.

Planted during month:

Koa .....	2046
Eucalyptus crebra .....	1357
Total .....	3403

## SUB NURSERIES.

Brother M. Newell reports the distribution of the following trees from the Hawaii Nursery at Hilo, during the month of March:

1000 trees in seed boxes	
150 trees in tins	
Total:	1150

James Lindsay reports the distribution of the following trees from the Nursery at Haiku, Maui, during the month of March:

175 trees in transplant boxes	
80 trees in tins	
Total:	255

Joe Rita reports the distribution of the following trees from the Nursery at Kalaheo, Kauai:

480 trees in tins	
Total:	480

## ADVICE AND ASSISTANCE.

The writer made one trip to Pearl Harbor Hospital at the request of Capt. Kindleberger, who is in charge of that institution and grounds. Capt. Kindleberger deserves great credit for the work he has done on the 40 acres of land under his control. A few years ago this land was covered with rocks, lantana, klu, stunted algaroba and other noxious weeds. The great interest and untiring efforts of the present officer has turned this desert into a beautiful garden spot. In front of the Hospital and looking towards the mountains a park of considerable extent is laid out and planted with ornamental trees and shrubs. Considering the soil and other conditions the plants are all doing remarkably well. Around the officers' houses connected with the institution, neatly laid out gardens planted with ornamental trees, vines, shrubs, etc., makes a pleasant comparison where here and there the vegetation of a few years ago still holds on to land not yet brought under cultivation. At the back, on the lagoon, Capt. Kindleberger has his orchard; avocado pears, mangoes, oranges, limes, lemons, papayas, bananas and other fruits are to be found in abundance; also all kinds of vegetables. The fine results are due, no doubt, to the love for plants and untiring efforts of the present incumbent. Capt. Kindleberger has taken a keen interest in beautifying the grounds around the Hospital from the beginning and has been allowed to stay long enough here to develop the work he so worthily started. It is to be hoped that his superiors in Washington may allow him to continue his work here so that he may be able to satisfy his ambition and enable him to work out his hobby.

The writer has made the following number of visits and otherwise

given advice and assistance as follows, at the request of people in and around the city:

Visits made .....	8
Advice by telephone .....	7
Advice to people calling .....	6

Respectfully submitted,

DAVID HAUGHS,  
Forest Nurseryman.

## DIVISION OF ENTOMOLOGY.

### REPORT OF THE ACTING ENTOMOLOGIST, MARCH, 1921.

Honolulu, Hawaii, March 31, 1921.

Board of Commissioners of Agriculture and Forestry,  
Honolulu, T. H.

Gentlemen:

During the month of March the insectary handled 19,600 pupae of the melon fly, from which the following were bred: 3,635 females and 3,235 males, *Opius fletcheri*.

The distribution of parasites was as follows:

#### MELON FLY PARASITE.

##### *Opius fletcheri*

	Females.	Males.
Oahu:		
Moiliili .....	300	300
Wahiawa .....	1100	1100
Pearl Harbor .....	100	100
Kamehameha IV Rd. ....	700	700

#### FRUIT FLY PARASITES.

##### *Diachasma tryoni*

	Females.	Males.
Oahu:		
Kalihi Valley .....	240	240
Nuuanu Valley .....	490	460
Manoa Valley .....	100	100
Kaimuki .....	100	100
Maunawai .....	50	50

	Females.	Males.
Molokai:	150	150

##### *Diachasma fullawayi*

	Females.	Males.
Oahu:		
Nuuanu .....	490	490
Kalihi .....	290	290
Kaimuki .....	100	100
Maunawai .....	50	50
Manoa .....	120	120

	Females.	Males.
Molokai:		
Geo. Cooke's .....	150	150

*Opius humilis*

	Females.	Males.
Oahu:		
Nuuanu .....	200	200
Manoa .....	150	150
Kaimuki .....	120	120
Kalihi .....	50	50

	Females.	Males.
Molokai:		
Geo. Cooke's .....	100	100

*Dirhinus giffardii*

	Males and Females.
Oahu:	
Kalihi .....	1400

*Tetrastichus giffardianus*

	Males and Females.
Oahu:	
Nuuanu .....	1200
Kaimuki .....	300
Manoa .....	500

	Males and Females.
Molokai:	
Geo. Cooke's .....	500

## CORN LEAF HOPPER PARASITES.

*Paranagrus osborni*

	Males and Females.
Hawaii	
Waiohinu, Kau .....	200

Respectfully submitted,

E. M. EHRHORN,  
Acting Entomologist.

## DIVISION OF PLANT INSPECTION.

## REPORT OF THE CHIEF PLANT INSPECTOR, MARCH, 1921.

Honolulu, Hawaii, March 31, 1921.

Board of Commissioners of Agriculture and Forestry,  
Honolulu, T. H.

Gentlemen:

I herewith submit my report of the work carried on by the Division of Plant Inspection for the month of March, 1921, as follows:

During the month 52 vessels arrived at the Port of Honolulu, 27 of

which carried vegetable matter and 11 came by way of Panama. The following disposal was made of the various shipments:

Passed as free from pests .....	37,451 pkgs.	1678 lots
Fumigated with carbonbisulphide	1 "	1 "
Burned .....	45 "	45 "
Returned .....	1 "	1 "
<hr/>		<hr/>
Total inspected .....	37,498 pkgs.	1725 lots

Of these shipments 37,159 packages arrived as freight, 124 as baggage and 215 as mail.

#### RICE AND BEAN SHIPMENTS.

During the month 5575 bags of rice and 1257 bags of beans arrived from Japan and were passed as free from pests.

#### PESTS INTERCEPTED.

Approximately 851 pieces of baggage belonging to immigrants from foreign countries were examined from which 34 lots of fruit and 19 lots of vegetables were seized and destroyed. A tabulated list of material intercepted, other than the above mentioned fruits and vegetables follows:

From Australia:

March 23—1 plant, baggage, burned, prohibited.

March 23—1 plant, stop-over passenger, held in quarantine.

From Philippines:

March 7—1 pkg. seeds (*Ficus*), baggage, fumigated, precautionary.

From Florida, U. S. A.:

March 14—2 lots *Citrus* fruit, baggage, destroyed, prohibited.

#### BENEFICIAL INSECTS.

Following is a summary of the beneficial insects sent by Mr. Williams, now in Manila, to the Hawaiian Sugar Planters' Association. These were opened and examined by me in the presence of Mr. Muir.

Sherman, March 7—1 pkg. containing a lot of Fig insects.

1 vial of *Lycaena* egg parasites.

1 vial containing parasites of a seed pod moth similar to the Koa seed moth.

West Hixton, March 20—2 pkgs. *Blastophaga* on *Ficus retusa*.

#### HILO INSPECTION.

Brother M. Newell, Inspector at Hilo, reports the arrival of 9 vessels at Hilo. 5 carried vegetable matter consisting of 146 lots and 3887 parcels, all clean. 1580 bags of rice, 105 bags of beans and 8 bags of peanuts arrived from Japan and were passed.

#### KAHULUI INSPECTION.

Mr. L. Gillin, Inspector for Maui, reports the arrival of 5 vessels at Kahului. 3 carried vegetable matter consisting of 15 lots and 1970 parcels, all passed as free from pests.

#### INTER-ISLAND INSPECTION.

Sixty-two steamers plying between Honolulu and other Island ports were attended and the following shipments passed:



Taro .....	259 bags
Vegetables .....	196 cases
Fruit .....	149 cases
Plants .....	92 packages
Pine Shoots .....	3720 bags
Seeds .....	4 packages
Sugar Cane (H. S. P. A.) .....	6 cases
Total passed .....	4426 packages

Twenty-seven packages of plants, 4 packages of fruit and 3 packages of sugar cane were rejected on account of infestation, undesirable soil and non-compliance with the regulations.

#### LOCAL FUMIGATION.

During the month the following materials were fumigated for local concerns, etc.:

40 bags Beans	2 lots furniture
60 bags Middlings	7 baskets books
40 Calabashes	

Respectfully submitted,

E. M. EHRHORN,  
Chief Plant Inspector.

### DIVISION OF ANIMAL INDUSTRY.

#### REPORT OF THE TERRITORIAL VETERINARIAN, MARCH, 1921.

Honolulu, Hawaii, March 31, 1921.

Board of Commissioners of Agriculture and Forestry,  
Honolulu, T. H.

Gentlemen:

I beg to submit the following report for the month of March:

#### TUBERCULOSIS CONTROL.

From the appended report of the Assistant Territorial Veterinarian a total of 38 head of cattle were tested during the month with no reactors. Fourteen of these cattle came from the coast and the balance were cattle shipped in from the outlying islands. All tests were made at the quarantine station.

#### CONTAGIOUS EPITHELIOMA.

One thousand cc of vaccine for this disease was made up in the laboratory, a portion of which was sent to the island of Maui to control a small outbreak in a flock of turkeys and chickens.

#### SWINE DISEASE.

Nothing of an alarming nature has been reported during the past month. A few hogs were injected which were showing symptoms of pneumonia.

## QUARANTINE STATION.

The following animals entered the quarantine station:

Cows	Bulls	Calves	Horses	Mules	Hogs	Dogs
39	1	15	17	67	285	6

In order to save for the milk-consuming public the milk from cows temporarily quarantined, to comply with the requirements of the milk ordinance of the City and County of Honolulu, and in order to obviate a considerable unnecessary loss to the owners of such quarantined cattle, a milking shed with concrete floor was installed in an unused portion of the station. No government expense was entailed in the construction of this shed.

## BOVINE HEMORRHAGIC SEPTICEMIA ON HAWAII.

The situation on the Kaalualu Ranch has materially improved since last month. The writer personally superintended the vaccination of large number of the ranch cattle from February 27 to March 8. During that period no losses occurred in the entire district. Since my return the manager of the ranch has reported the loss of from 15 to 20 head of cattle practically all being cattle recently vaccinated. These cattle were undoubtedly in the early stage of the disease at the time of vaccination and consequently the protection afforded was not sufficient.

Since my return, 10,500 doses of vaccine were sent up. As instructions were issued to use double the dose this amount was sufficient to vaccinate 5,250 head of cattle.

The last report on the subject from Doctor Elliot would seem to indicate that the outbreak is under complete control. However, scattering losses may still be reported. As stated before, I do not consider there is any possibility of the spread of the infection to other districts.

Respectfully submitted,

LEONARD N. CASE,  
Territorial Veterinarian.

**REPORT OF THE ASSISTANT TERRITORIAL VETERINARIAN,  
MARCH, 1921.**

Honolulu, Hawaii, March 31, 1921.

Territorial Veterinarian,  
Honolulu, T. H.

Sir:

I beg to submit the following routine report for the month of March, 1921:

## TUBERCULOSIS CONTROL.

The following cattle were tested during the month:

	Tested.	Passed.	Condemned.
T. Nakamoto .....	8	8	0
Murphy Horse & Mule Co. ....	14	14	0
Manuel Mathias .....	5	5	0
E. J. Mahoney .....	1	1	0
Manuel Mathias .....	4	4	0
M. Salado .....	1	1	0
F. Teixeira .....	4	4	0
J. K. Cockett .....	1	1	0
Total .....	38	38	0

## RABIES CONTROL.

The following dogs were given anti-rabies vaccine:

B. A. Johnson, 1	E. Peshman, 2
W. C. McKay, 1	J. K. Flanders, 3

## LIVE STOCK IMPORTATIONS.

Of the twenty-five steamers inspected by me twelve carried the following live stock for this port:

## S. S. CLAUDINE, Hawaii.

8 cows,	
6 calves .....	Mr. Nakamoto

## S. S. WEST HIKA, Los Angeles, Cal.

25 mules,	
5 horses .....	Murphy Horse & Mule Co.
14 cows,	
284 butcher hogs .....	F. H. Lacey

## S. S. LURLINE, San Francisco.

1 hog .....	Kamehameha Schools
4 crates poultry .....	C. H. Bellina
20 mules .....	C. Brewer & Co.
14 crates poultry .....	Chang Brothers
8 polo ponies .....	Walter Dillingham
3 Airedale dogs .....	J. K. Flanders
1 Shetland pony,	
2 saddle horses .....	Mrs. W. P. Roth
22 mules,	
1 horse .....	Schuman Carriage Co.
52 crates poultry .....	Wo Chong

## U. S. A. T. BUFORD, San Francisco.

2 dogs .....	E. Peshman
--------------	------------

## S. S. MANOA, San Francisco.

69 crates poultry .....	Various
-------------------------	---------

## S. S. MAUI, San Francisco.

1 dog .....W. C. McKay

## S. S. MAUNA KEA, Hilo.

5 cows,  
3 calves .....M. Mathias

## S. S. MAUNA KEA, Hilo.

4 cows,  
2 calves .....M. Mathias

## S. S. WILHELMINA, San Francisco.

29 crates poultry .....Various

## S. S. MAUNA KEA, Hilo.

1 cow .....M. Salado  
3 cows,  
1 bull .....F. Teixeira

## S. S. HYADES, Seattle.

1 crate poultry .....J. A. McGuire

## S. S. KILAUEA, Maui.

4 cows,  
4 calves .....Antone Delgado

## SWINE DISEASE.

Twenty-two pigs were injected with Hemorrhagic Septicemia Bacterin and Mixed Infection Bacterin at Mr. A. L. C. Atkinson's ranch.

Autopsy on a valuable sow at Mr. Love's farm showed the animal to have died of pneumonia, presumably of swine plague origin. A few days later another sow, with litter, showed alarming symptoms of pneumonia. Hemorrhagic septicemia bacterin (swine) was administered and after three doses the sow made complete recovery and raised her litter. The whole herd was then treated with the same bacterin. Later all small pigs were given hog cholera serum at the request of the owner.

Respectfully submitted,

L. E. CASE.

Assistant Territorial Veterinarian.

BY AUTHORITY.

## PERMITS TO START FIRES REQUIRED.

Notice is hereby given that, in accordance with Sec. 497, R. L. H. 1915, IT IS FORBIDDEN to start fires to clear land, including the burning of fallows, stumps, logs, brush, dry grass or fallen timber, for the period from May 1 to December 31, 1921, on any land in that part



of East Hawaii from Waipio Valley to Kau, unless written permission has first been obtained from the local District Fire Warden. The law requires that "Such fires shall not be started during a heavy wind or without sufficient help present to control the same and the fire shall be watched by the person setting the same, or by competent agents of his, until put out."

The District Fire Wardens for East Hawaii are: W. P. Naquin, Honokaa, from Waipio Valley to Koholalele; D. S. Macalister, Kukaiau, from Kukaiau to Manowaialee; John M. Ross, Hakalau, from Ookala to Kukupakuea; J. J. Ignacio, Papaaloa, for the land of Laupahoehoe; J. T. Moir, Papaikou, from Makahanaloa to Paukaa; James Henderson, Hilo, from Kikala to Waiakea, inclusively; and A. J. Watt, Olaa, for Puna.

C. S. JUDD,  
Chief Fire Warden.

Honolulu, T. H., April 20, 1921.



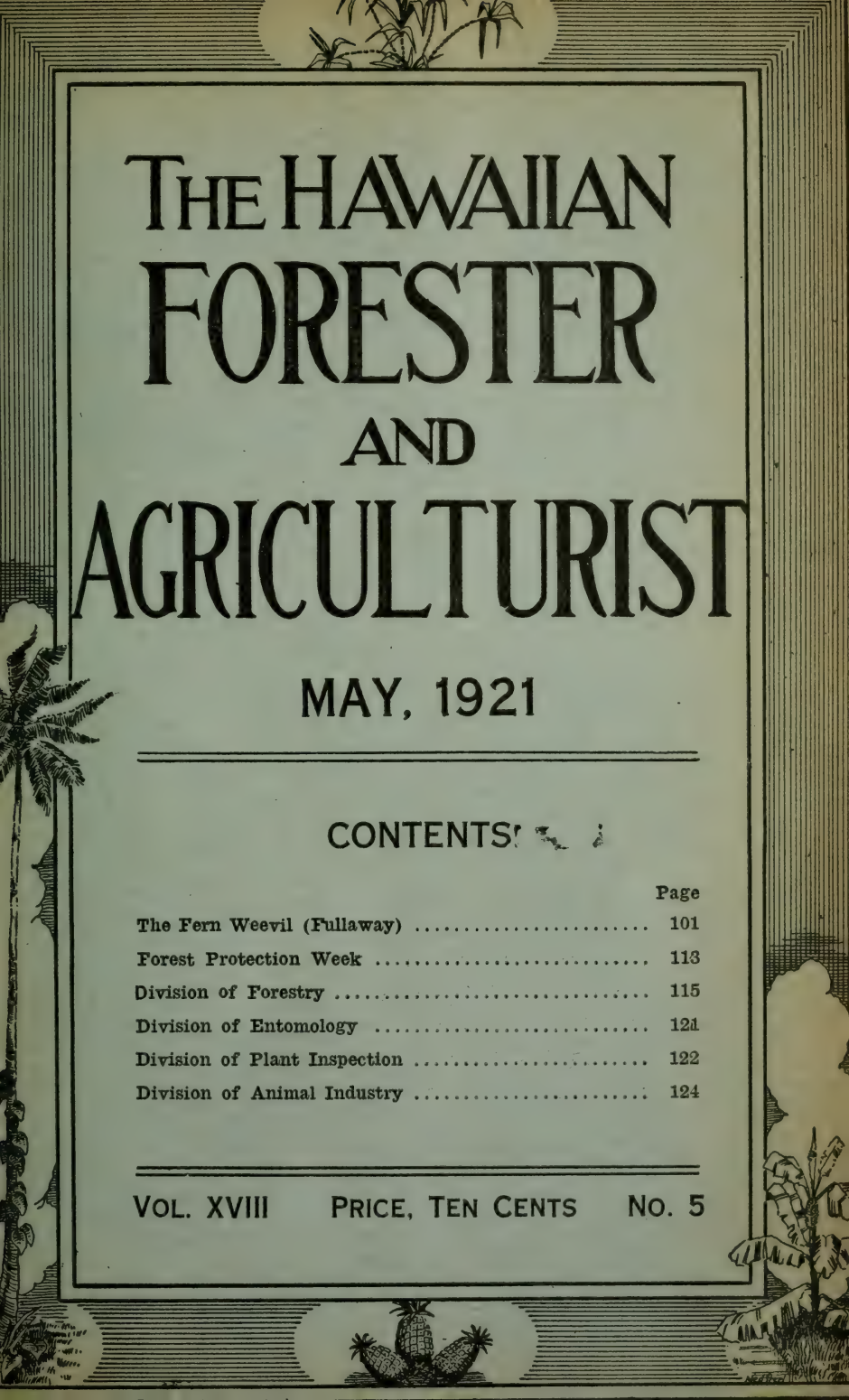












# THE HAWAIIAN FORESTER AND AGRICULTURIST

MAY, 1921

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(1921)

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# THE HAWAIIAN FORESTER AND AGRICULTURIST

VOL. XVIII.

HONOLULU, MAY, 1921.

NO. 5

## THE FERN WEEVIL.

(*Syagrius fulvitaris* Pasc.)

By DAVID T. FULLAWAY, *Entomologist.*

### INTRODUCTION.

Attention has recently been drawn to the fact that the prevalence of the fern weevil in the Hilo district constitutes a menace to the forests of Hawaii. A new significance is thus given to the presence of the insect in the islands, which has heretofore been considered only as a greenhouse pest. In view of the serious nature of the situation on Hawaii and the importance of doing all that is humanly possible to prevent the insect from gaining access to the forests, it has seemed desirable to publish an account of the weevil, presenting all the information at present possessed concerning it. The account which follows deals with the position, origin, history, distribution, life history and habits of the insect and the means which may be employed to combat it.

### POSITION, ORIGIN, DISTRIBUTION AND HISTORY OF THE FERN WEEVIL.

The fern weevil, *Syagrius fulvitaris*, is classed in the subfamily Cossoninae of the Rhyncophora. Pascoe, the describer, referred it at the time to the Molytinae, remarking that while it resembles species of *Anchonus*, it is geographically allied to the single species included in the rare genus *Steremnius*. It is an immigrant species here, without close relatives in the islands, and is known elsewhere only in Australia, whence probably it was carried here. A similar insect, said, however, to differ in essential points, and described under the name *Syagrius intrudens*, by Waterhouse, appeared in the Botanic Gardens of Dublin, Ireland, in 1902. Presumably it also came from Australia, but its presence there is yet to be recorded. A third, related species found in greenhouses in Australia attacking maiden-hair ferns was brought to notice in 1904 by Froggatt. While closely allied to *Syagrius*, it is not congeneric, according to Lea, and required

the definition of a new genus, *Neosyagrius*, to place the single representative described under the name *cordipennis*. The above data, which constitutes all the evidence at hand, indicates Australia to be the original habitat of *Syagrius fulvitaris*, and it is generally so considered.

The fern weevil was first observed in Hawaii in 1903. In November of that year the late F. W. Terry collected it on a *Cibotium* fern on Pacific Heights, above Honolulu. In the following month he collected it again on a cultivated fern at the residence of Mrs. Parmalee, on Beretania Street, in Honolulu. In May of 1905, Mr. O. H. Swezey reared individuals from the bored stipes of a *Sadleria* fern (*Sadleria cyatheoides*) collected along the path on Pacific Heights Ridge at the edge of the forest. Since its initial appearance it has spread in the mountains back of Honolulu as far west as Nuuanu Pali and as far east as the Manoa Valley side of Tantalus mountain. In the city it has been carried everywhere in basket and potted ferns, and in 1909 appeared in greenhouses in the town of Hilo on Hawaii. It has now spread over the entire town, from Wainaku to Waiakea, in the fish-tail and Boston ferns, was recently discovered infesting *Sadleria* ferns at Kilauea, and is also reported from Ninole, seventeen miles north of Hilo on the railroad.

#### HOSTS AND INJURIES, METHODS OF SPREADING IN HAWAII.

The fern weevil attacks various species of ferns but is not known to be attached to any other plants. In Australia, it is said to feed on the fleshy leaf-stalks of *Calopteris prolifera*. In Hawaii, it is commonly found on the maiden-hair fern (species of *Adiantum*), fish-tail and Boston ferns (forms of *Nephrolepis exaltata*), lauwahee fern (*Polypodium phymatodes*), cultivated species, and is also known to attack *Cibotium chamissoi* (the tree fern), *Diplazium marginale*, *D. sandwicheanum*, *Microlepia hirta* and an undetermined species of *Asplenium*, endemic species, as well as *Sadleria cyatheoides*, already referred to, on which its injuries have been more extensive and severe. This species appears in some ways to be a favored host, while the tree fern, *Cibotium chamissoi*, was for some time considered to be immune to attack. The difference in the degree and extent of infestation is apparently due to the varying degrees of suitability of the plant to the weevil's activities. The leaf stalks of *Sadleria cyatheoides*, being large and fleshy, are suited to the reception of eggs, development of the larva and support of the adult. The leaf stalks of most other ferns, however, are either of harder consistency or are smaller in diameter; those of the tree fern, while of greater diameter, are considerably harder at the base, although the weevil has been reared from egg to adult a number of times in the tender tips of new shoots.

The fern weevil is injurious in both the larval and adult stage. The larvæ work internally, boring or tunneling the stipe or



rhizome; the adults externally, gnawing the surface of the frond and consuming the abraded particles. The leaves are often eaten from the edge. The damage suffered by the plant depends upon the severity of the attack, which in turn will be relative to the excess or poverty of weevils according to the conditions for their multiplication. It has been observed that while plants may be badly shattered as the result of the attacks of the weevil, they do not readily succumb, but linger on in a stunted condition for long periods.

The evidence at hand indicates that the progress of dispersion in the case of the fern weevil is comparatively slow, when human interference plays no part in it. In fifteen years the weevil extended its range less than five miles in the mountains back of Honolulu. The advance was presumably more rapid at Hilo on account of the greater abundance of ferns. Being entirely without wings, the weevil is flightless, and its only means of locomotion is crawling. It also appears to remain inactive a large part of the time. These two factors are undoubtedly responsible for the slow progress before mentioned. Human activity, however, forms an important feature of the dispersion. The transportation of ornamental plants from one locality to another seems to be the chief means of distribution of this weevil, and extraordinary distances are often thus traversed. The weevil also readily attaches itself to clothing, the hair of animals, etc., and by this means can be carried far.

#### LIFE HISTORY.

The fern weevil exhibits in its development what is known as complete metamorphosis; that is to say, there are four distinct stages in the life-cycle of the insect, namely, the egg, larva or grub, pupa and adult.

The egg: The egg of the fern weevil is elliptical, smooth, pale yellow, 1 mm. long (Pl. I., figs. 1 and 1a). It is placed, singly, .5 mm. below the surface of the fern stipe or stem, in a cavity previously eaten out by the female weevil. After the deposition of the egg, the external opening of the cavity is closed with frass. The incubation period is about 9 days. (See Table I.) (All rearing and other life-history work done in the entomological laboratory of the Board of Agriculture and Forestry at Honolulu. The data here given applies only to this locality.)

The larva: The larva on hatching is about  $1\frac{1}{2}$  mms. long, creamy to sordid white, the head a little darker, the heavily chitinized mandibles, especially on the cutting edge, dark brown. There are conspicuous hairs on the plate behind the labium, at the apex of the ultimate, and on the dorsal surface of the penultimate segment. The larva molts several times during the course of its growth, each time increasing in size. The full grown larva is 8 mms. long when crawling, 6 mms. long when curled. It is

white with reddish brown head (light brown ochre), front of the head and mandibles apically black and typically rhyncophorid in form. The essential characters are illustrated in Pl. I., figs. 2 and 2a.

The head is strongly chitinized, globose, somewhat depressed. From the base a median pale line passes forward, the epicranial suture. It divides anteriorly and forms the frontal sutures, which enclose laterally the sub-triangular area known as the frons, margined in front by the epistoma. The large areas on either side of the epicranial suture are the epicranial areas, further bounded by the frontal sutures, the pleurostoma and the hypostoma. In front of the frons is the more or less rectangular clypeus, which is more than twice as wide as long, and in front of this is the labrum, also transverse with rounded anterior margin. The clypeus and labrum partly overlap the mandibles, which arise at the side of the clypeus, based below on the pleurostoma and above on the frons. Directly behind the mandibles and in the anterior lateral angle of the frons are the antennae, and behind the antennae but in the epicranial area are small pigmented ocelli. The maxillae lie free from the head skeleton below the hypostoma and behind the mandibles. They consist of the stipe and lacinia, the cardo or basal piece, and the two-segmented palpi at the apex. The labium, which lies in the median line below the obstructed mouth opening, consists of scutiform "stipes labii" surmounted by two-segmented palpi. Below and around it are the large, fleshy lobes constituting the mentum and submentum. There is a small, abortive branch of the frontal suture extending back on the epicranium on each side of and not far from the epicranial suture. The setae on the epicranium are arranged as follows: On each lobe one near the terminus of branch of frontal suture, one on the disc opposite the preceding, one opposite middle of frons, one on lateral margin behind this and one at base of mandibles. On the frons there are three pairs, the posterior on the lateral suture, the middle behind the anterior margin and on either side of and close to median line, the anterior in anterior lateral angle near antennae. On the labrum there are three setae on either side of the median line and many short hairs on anterior margin. There is one on the outer face of mandibles. On the maxillae there are two setae near the apex and one near the base of the stipe, and the lacinia has a fringe of short stout hairs outwardly. The "stipes labii" has one pair of setae near the base and some small hairs near the apex. Each lobe of the mentum has one pair of setae. The pronotum is simple, undivided, feebly chitinized, with three setae on the disc on either side. The mesonotum and metanotum are composed of prescutum and scutoseutellum. The first six abdominal sclerites are composed of a fusiform prescutum, a transverse scutum terminated by a spiracle, a fusiform scutellum and a transverse postscutellum, very greatly narrowed on the dorsum. The scutellum of each segment has a prominent hair on either side of the median line (more laterad on the scutoseutellum of the meso- and metathorax) and these together form longitudinal series. There are two setae on the pleurae and abdominal segments, also forming longitudinal series, and many short, fine hairs scattered over the surface. There are eight abdominal spiracles and one on the prothorax; this and the one on the eighth abdominal segment are very large. The ninth abdominal segment is very much reduced in size, the eighth somewhat also, and the hairs on these segments, as well as those on the scutellum of the seventh segment are larger than elsewhere on the body.

The larval development occupies from one to four months. The largest number of those reared pupated on the 51st day after hatching from the egg (see Table II.).

The pupa: When full grown the larva enlarges the tunnel in

which it is working to form a chamber for pupation. At this time it becomes less active, its form changes, the body becoming shorter and thicker; finally it molts again and appears as a pupa. Although the pupa is not entirely immobile, the pupal condition is considered a resting stage, during which the transformation from grub to beetle occurs. The pupa is illustrated in Pl. I., fig. 3. It is 7 mms. long, white, elytra pads often flaring.

Head almost entirely ventrad, the apical margin of the thorax nearly attaining the front margin of the head, apex of the beak reaching slightly beyond the posterior margin. Antennae geniculate, the apex reaching the posterior margin of thorax. Six abdominal segments are exposed on the ventral side, nine on the dorsal. There is a pair of large setose tubercles on the front medially and a pair of small ones laterally on the head, one pair and four single setose tubercles in a row on either side of the beak. The prothorax has a row of three on either side of the median line, two laterad of a point midway between the first and second from anterior margin, a row of three near the lateral margin and opposite the posterior of the median series, and one about midway between, close to the posterior margin. The mesothorax has a pair on either side of the median line. Each of the abdominal segments to the eighth has a transverse row of setose tubercles near the posterior margin; the eighth has a large one on either side of median line with a pair of small ones inside and several small ones outside; the ninth has a pair of small ones on either side of median line and is terminated by a large pair. The spiracle on the mesothorax is directly laterad of base of wing covers; there is also one at the base of the rudimentary wings, and one on either side of the abdominal segments anterior to and a little below the most laterally situated of the dorsal setae. The wing covers extend as far as the legs, are pointed apically and have a number of longitudinal grooves. They lie between the second and third thoracic legs on either side. At the femorotibial articulation on each of the legs there is also a pair of setae.

The pupal stage occupies about nine or ten days (see Table III.). The adult is three or four days obtaining its usual color and hardness. It then gnaws a circular exit hole (e) through the outer wall of the pupal chamber and emerges (Pl. I., fig. 6a).

The adult: The adult is illustrated in Pl. I., fig. 4, 4a, 4b, and is described as follows:

*S. oblongo-parallelus, niger*, sparse setulosus; capitis fronte bituberculata, inter tubercula breviter lineatim sulcata; rostro prothorace paulo brevior, dimidio basali grosse lineatim punctato; antennis fulvo-ferrugineis, funiculi articulo basali breviusculo, secundo duplo longiore, caeteris transversis et ad apicem gradatim crassioribus; prothorace latitudine longitudini aequali, supra rugoso, in medio tuberculis duobus parvis instructo; elytris prothorace vix duplo longioribus, pone basin supra subito elevatis, irregulariter tuberculatis, et grosse impresso-punctatis; corpore infra nigro, segmentis duobus basalibus abdominis grosse punctatis; tarsis fulvo-ferrugineis. Long. 2 lin.

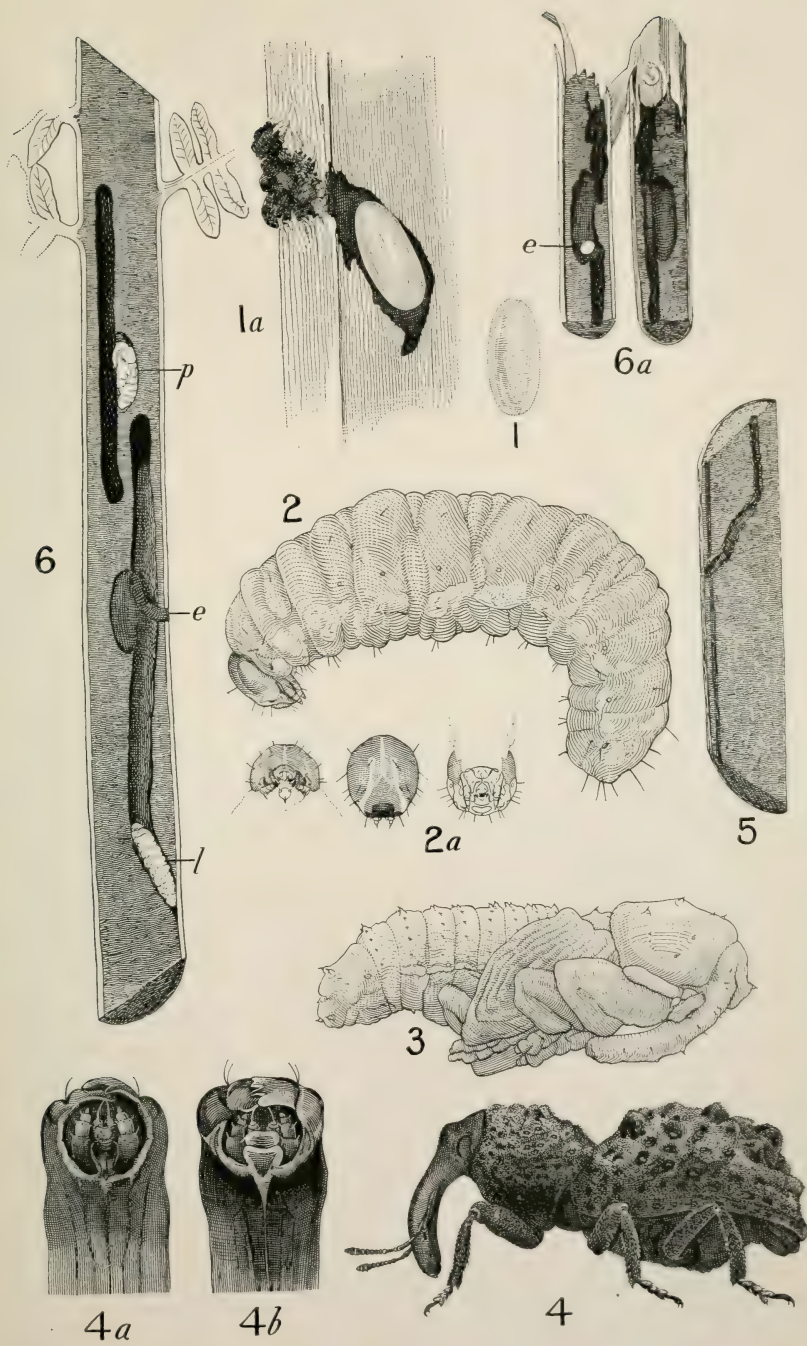
*Syagrius oblong-parallel*, black, sparsely setulose, with the front bituberculate, between the tubercles shortly lineate sulcate; rostrum a little shorter than the prothorax, basal half coarsely lineate punctate; antennae fulvo-ferrugineous, basal segment of the funicle rather short, second twice as long, the others transverse and gradually thickened towards the apex, prothorax with the length and breadth equal, rugose above, provided with two small tubercles in the middle; elytra scarcely twice as long as the prothorax, behind the base suddenly elevated upward, irregularly tuberculate and coarsely impresso-punctate; body beneath black, with the two basal segments of the abdomen coarsely punctate; tarsi fulvo-ferrugineous. Length 2 lines.

## PLATE I.

**THE FERN WEEVIL.***Syagrus fulvitaris* Pasc.

- Fig. 1. Egg (greatly enlarged).
- Fig. 1a. Section of fern stem showing egg-chamber (greatly enlarged).
- Fig. 2. Larva (x10).
- Fig. 2a. Head of larva from front, above and beneath, showing mouthparts (x10).
- Fig. 3. Pupa (x10).
- Fig. 4. Adult weevil (x10).
- Fig. 4a, b. Apical extremity of rostrum of adult weevil showing mouthparts (greatly enlarged).
- Fig. 5. Section of fern stem showing gallery of freshly-hatched larva (somewhat enlarged).
- Fig. 6. Section of fern stem showing galleries of more advanced larvae, and pupal chamber with exit—l, larva; p, pupa; e, exit (somewhat enlarged).
- Fig. 6a. Portion of the preceding in greater detail (natural size).









The beetles appear to be very hardy and long-lived. Individuals confined in tubes and fed daily have remained alive under observation from a few days to many months. They vary greatly in size but the sexes apparently differ very little. Observations on mating have not been as extensive as desirable, but those made indicate that sexual maturity is not attained until some weeks after emergence as adult beetles, although occasionally eggs are previously extruded by the female. Eggs dropped by unfertilized females failed to hatch. While individuals of varying age, from freshly emerged to fourteen days old, when confined together, evinced no signs of sexual attraction, older individuals, from two weeks to three months old, when confined together in groups of approximately similar age, appeared to be strongly attracted; in most cases mating occurred at once, in a few it occurred after the lapse of several days. Oviposition follows mating directly, and the cycles are apparently continuous and without interruption, one generation succeeding another. A summary of the different developmental stages (see Table IV.) indicates the average length to be 78.6 days and allowing fifteen to sixty days for the attainment of sexual maturity and deposition of eggs, a cycle would occupy three to four and one-half months, or expressing it in another way, there could be three generations a year, on an average. A study of the tables discloses that seasonal variations are obscured in the wide range of individual variation. Observations made on the deposition of eggs while giving very irregular results indicate that the rate per individual will not average more than one a day. Table V is an incomplete record of the oviposition of a single female and of the females in a mixed lot of seven individuals. Where mating did not occur, it was noticed that there was a tendency in the female to drop the eggs anywhere, but regularly mated individuals usually deposited the egg securely in the cavity bored with the beak in the fern-stem expressly for its reception. Many cavities examined, however, contained no eggs.

#### METHODS OF COMBATING THE FERN WEEVIL.

The methods to be followed in combating the fern weevil will depend upon the circumstances of the infestation. Hand-picking the adults will reduce the number and lessen the possibility of injury, but their secretive habits must be taken into account. The adults can also be poisoned with arsenate of lead applied in powdered or liquid form to the plants on which they are feeding. Where the adults are hiding in the soil at the base of the plant it is often possible to bring them into view by flooding the earth. A prolonged soaking is likely also to smother the larvæ and pupæ. Usually, however, the only effective remedy for a badly infested stand of ferns is the destruction of the ferns, and this must be thorough and complete.



## NATURAL ENEMIES.

Natural enemies of the fern weevil were unknown until the recent investigations of Mr. C. E. Pemberton, field entomologist on the staff of the Hawaiian Sugar Planters' Experiment Station, in Australia (made subsequent to the preparation of this bulletin) disclosed a hymenopterous insect—referred to the genus *Doryctes* (Braconidæ)—parasitic in its larval stage upon the larva of the weevil, and exercising a decided check on its depredations in the forests of northern New South Wales. This insect has been sent to Hawaii in numbers and liberated in the localities where the fern weevil prevails. If its establishment succeeds from these liberations it may prove of great benefit, as the forests would unquestionably be damaged by the fern weevil's destruction of the largest component of their under-cover.

In endeavoring to multiply the Australian parasite under artificial conditions at Honolulu, another hymenopterous insect has been reared from the fern weevil, namely, *Ischiogonus palliatus*. This insect has been known in Hawaii for many years as an enemy of Cerambycid and Curculionid beetles.

In connection with the subject of natural enemies, it should be mentioned that the beetles are destroyed to some extent by a parasitic fungus.

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TABLE V.

Daily Record of Oviposition of a Single Female *Syagrius fulvitaris* and of Females in a Mixed lot of 7 Individuals.

(1) Adults March 20-26 mated May 15:

May	17-18	.....	2	eggs
May	18-19	.....	2	eggs
May	19-20	.....	1	egg
May	21-22	.....	1	egg
May	22-23	.....	1	egg
May	26-27	.....	1	egg
May	27-28	.....	1	egg
May	28-29	.....	1	egg
May	30 to June 1	.....	1	egg
June	2-3	.....	1	egg
June	4-5	.....	3	eggs
June	10-11	.....	1	egg
June	11-12	.....	2	eggs

(Incomplete)

(2) Adults of April 5th, 6th, 7th, 8th, 9th, and 10th of January—joined May 15 and mated subsequently:

May	22-23	.....	1	egg
May	25-26	.....	2	eggs deposited outside
May	26-27	.....	1	egg
June	7-8	.....	1	egg deposited outside
June	8-9	.....	1	egg
June	9-10	.....	1	egg
June	22-23	.....	1	egg
June	24-25	.....	2	eggs deposited outside
June	26-27	.....	2	eggs deposited outside
July	5-6	.....	1	egg deposited outside
July	8-9	.....	1	egg deposited outside
July	12-13	.....	1	egg deposited outside; 1 adult dead
July	19-20	.....	1	egg deposited outside
July	20-21	.....	1	egg deposited outside
July	26-27	.....	2	eggs deposited outside
July	28-29	.....	1	egg deposited outside
August	1-2	.....	1	egg deposited outside
August	2-3	.....	2	eggs deposited outside
August	16-17	.....	1	egg deposited outside
August	19-20	.....	1	egg deposited outside
August	21-22	.....	1	egg deposited outside
August	27-28	.....	1	egg deposited outside
September	2-3	.....	1	egg deposited outside
September	4-5	.....	1	egg deposited outside
September	5-6	.....	1	egg deposited outside
September	17-18	.....	1	egg deposited outside
October	11-12	.....	1	adult dead
October	30 to November 1	..	1	adult dead

## FOREST PROTECTION WEEK.

The period May 22 to 28 is being celebrated on the mainland as Forest Protection Week in accordance with the following Proclamation issued by President Harding on April 7:

Forest Protection Week  
May 22-28, 1921

By the President of the United States of America

### A PROCLAMATION

WHEREAS, the destruction by forest fires in the United States involves an annual loss of approximately \$20,000,000 and the devastation of approximately 12,500,000 acres of timberland and other natural resources, and

WHEREAS, the present deplorably large area of non-productive land is being greatly increased by 33,000 or more forest fires which occur each year, and

WHEREAS, the menace of a future timber shortage threatens to become a present economic fact seriously affecting our social and industrial welfare, and

WHEREAS, a large percentage of the forest fires causing the annual waste of natural resources may be prevented by increasing care and vigilance on the part of citizens:

THEREFORE, I, WARREN G. HARDING, President of the United States, do urge upon the Governors of the various States to designate and set apart the week of May 22-28, 1921, as Forest Protection Week, and to request all citizens of their States to plan for that week such educational and instructive exercises as shall bring before the people the serious and unhappy effects of the present unnecessary waste by forest fires, and the need of their individual and collective efforts in conserving the natural resources of America.

IN WITNESS WHEREOF, I have hereunto set my hand and caused the seal of the United States of America to be affixed.

DONE in the District of Columbia, the 7th day of April, in the year of our Lord, One Thousand Nine Hundred and Twenty-one and of the Independence of the United States of America the One Hundred and Forty-fifth.

WARREN G. HARDING.

By the President:

CHARLES E. HUGHES,  
Secretary of State.

President Harding's Proclamation bids the American people to look to the protection and care of their remaining forest resources. That there is need for such admonition is fully warranted when one faces squarely the facts of timber depletion.

Forest destruction has now reached a point in the United States where three-fifths of the primeval forests are gone and 61 per cent of the timber that is left is west of the Great Plains.

The exhaustion of American timber has not come about because the forests have been used so freely, but because of the failure to keep down forest fires and to use forest growing lands.

In a nut shell, the problem is that the United States is cutting wood out of its forests three or four times as fast as it is being grown. Timber for the future is simply a matter of putting idle land to work and to protect the growing trees from damage by fire.

While the Territory of Hawaii is not a timber producing country, the principles involved in the celebration of Forest Protection week should be well understood by all of the residents of this Territory. The Hawaiian forests give forth a product in the form of water which is much more valuable than the crop of timber which could be produced on the areas from which this continuous supply of water emanates. Water is the agricultural life blood of these islands, because without it, the main agricultural crop could not be produced.

It behooves every inhabitant of the Territory therefore to use the greatest care with fire, in order to prevent destruction to the forest which conserves the water supply.

Fortunately the fire menace in these Islands is not, as a rule, very serious, but there are times when, owing to lack of rain, fire may be easily started which might do incalculable damage to the native forest.

During the past two calendar years there were reported to the Chief Fire Warden of the Territory fifteen forest and grass fires which covered from less than one acre to over 5500 acres of area burned over. All of these fires were preventable and were caused by human carelessness. The Territory has, throughout the Islands, fifty-five public spirited citizens who have received commissions from the Board of Agriculture and Forestry as District Fire Wardens. These gentlemen have done excellent work in performing their duties prescribed by law, viz: To prevent, control and extinguish forest fires. They have the authority to employ all able-bodied male persons between the ages of 16 and 50 years for assistance in putting out fire. They report promptly to the Chief Fire Warden in Honolulu all fires in their respective districts and take immediate and active steps toward their extinguishment and assist in apprehending offenders against the forest fire law, which is as follows:

Sec. 496. Every person who wilfully, maliciously or negligently sets on fire or causes or procures to be set on fire any woods, brush, prairies, grass, grain or stubble on any lands not owned, leased or controlled by him; and every person who wilfully, maliciously or negligently allows a fire to escape from land owned, leased or controlled by him whereby any property of another is injured or destroyed; and every person who accidentally sets or causes to be set any fire on land not owned, leased or controlled by him, or sets or causes to be set any fire on land owned, leased or controlled by him, which spreads to the land of another, and allows said fire to escape from his control without using every effort to extinguish it, shall be deemed guilty of a misdemeanor and liable to a fine of not less



than twenty-five dollars nor more than five thousand dollars. Setting such fires or causing or procuring them to be set or allowing them to escape shall be prima facie proof of wilfulness, malice or negligence under this Section; provided that nothing herein contained shall apply to a person who, in good faith, sets a back fire to check a fire already burning.

C. S. J.

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## DIVISION OF FORESTRY.

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### REPORT OF THE SUPERINTENDENT OF FORESTRY, APRIL, 1921.

Honolulu, Hawaii, April 30, 1921.

Board of Commissioners of Agriculture and Forestry,  
Honolulu, T. H.  
Gentlemen:

I respectfully submit the following report of the Division of Forestry for the month of April, 1921:

#### TREE PLANTING.

Tree planting was done with the two regular gangs of planters and amounted to a total of 3,363 trees set out, as follows: 500 Australian red cedar on the Tantalus Ridge in the Honolulu Watershed Forest Reserve to replace eucalyptus windfalls, and 2,713 koa planted under the palis on the Nanakuli side of Kolekole Pass and 150 red mahogany trees along the boundary fence in the Lualualei Forest Reserve.

During an inspection trip in the Lualualei Forest Reserve on April 21 about 12 pounds of seed of the Moreton Bay fig, koa, big tree, African tulip tree, ironwood, Japanese cedar, Indian wiliwili, swamp mahogany, ear pod, red gum and silk oak trees were broadcasted from the Halona ridge below Puu Kana at an elevation of about 2,000 feet as an experiment to determine whether any results may be expected from this method of reforestation. On the previous day four boxes at the Mikilua Nursery were sown with Moreton Bay fig seed (*Ficus macrophylla*).

On April 8, 410 seeds of the chaulmoogra oil tree (*Taraktogenos Kurzii*) were received from the Upper Chindwin in Burma. Of these 200 were planted at once in the nursery and 50 sent to each of the other three main nurseries for propagation. On April 15, 195 seeds of the same species were received from the same place and sowed at the government nursery the same day. Seed received in previous shipments is germinating very satisfactorily and over 2,000 seedlings will soon be available for the chaulmoogra plantation which I propose to establish in the Waiahole Forest Reserve, Oahu.

#### FOREST FENCING.

Repairs to existing fences on forest reserve boundaries have been made during the month as follows:

Ranger Lovell has repaired 310 feet of fence in the Kealia Reserve, Kauai.

In the Lualualei Reserve, Oahu, 450 feet of boundary fence were

repaired and 150 trees planted along the fence by a laborer from the Mikilua nursery.

Repairs being made to the boundary fence in the Koolau Forest Reserve, Maui, back of the Nahiku homesteads, which virtually constitutes a new fence, amounted to 3,200 feet up to the end of April with 4,365 feet yet to receive attention.

Before being called away from Maui, Ranger Ellis had completed 2,664 feet of new fence on the upper boundary of the Kula Reserve. There remain 1,000 feet of wire fence and 675 feet of stone wall to be built before the gap between Kanahau and Kalepeamoa is closed up.

Ranger Mackenzie on Hawaii reports having repaired 5,993 feet of fence on in Section C, and 12,018 feet of fence in Section A of the Olaa Forest Park Reserve during March, not previously reported, and 11,770 feet of fence in Section A of the same reserve during April.

#### HAWAII TRIP.

During a visit to Hawaii made with President Atkinson on April 1-4, an inspection was made of the nursery and tree plantings at Pahala, in Kau and on the Kapapala Ranch in the same district. Manager Monsarrat pointed out three phenomena of interest. The most serious of these, from the stockman's viewpoint, is the encroachment of the ohia lehua trees by natural reproduction onto some of the best pasture lands of the ranch. A young forest of these trees is coming up rapidly on several hundred acres and forms such a dense cover that the land is ruined for grazing. The curious circumstance of this invasion is the fact that the forest is spreading out against the direction of the prevailing wind so that dispersal of seed by wind can not account for the new forest. This young reproduction which comes up through high Hilo grass appears to have more or less definite age classes, corresponding to the years when there have been excessive floods down the slope of Mauna Loa, and this leads to the belief that the young forests have started from seed of the ohia which has been washed down the mountain slopes from the older trees in the forest reserve and which has received sufficient sunlight for germination because of the rank grass being flattened to the ground by the flood waters.

The native poisonous shrub akia (*Wikstroemia sandwicensis*) is also spreading at a noticeable rate on pasture lands along the main government road near the old half-way house in Kau. The attractively colored seeds are apparently being scattered by birds, but cattle know enough not to eat the foliage of this plant which is extremely poisonous.

On other parts of the Kapapala Ranch Mr. Monsarrat pointed out areas where Hilo grass, which used to be at least two feet high and cover the ground with a solid mat, has died out entirely and been replaced by *Paspalum dilatatum* the seed of which he has sowed. In this manner he has been able to improve greatly many acres of land for grazing purposes. Specimens of the dead Hilo grass were submitted to our consulting pathologist, who ascribes the welcome trouble to some root rot, probably *Pythium* similar to the fungus disease which causes root rot in sugar cane.

#### FOREST PROTECTION.

During an inspection made of the Lualualei Forest Reserve on April 20, a mile of forest was traversed from the Kolekole Pass trail toward Nana-kuli along the talus slope at the foot of the cliffs. Here an impenetrable jungle was encountered and traveling was most difficult owing to the very heavy growth of lantana, guava, and cassia bushes, kakalaioa and morning glory vines, and young growth of kukui and olopua. At one place mountain apple and banana trees were found, indicating the presence of much

moisture. In no part of this area were there any trails, proving the total absence of stock. All of this excellent cover is a result of the complete protection which has been given this forest since the fence was repaired in 1915.

The wild goats on the higher elevations in this reserve are fast being exterminated. From one to two years ago it was possible to shoot 25 goats in a day with ease. On this trip after a hard morning's work only nine goats fell to three rifles and only a few other goats were seen.

The damage done to government property in Mikilua Valley by mischievous soldiers while off duty was reported to you on April 22.

#### NEW WAIMANALO RESERVE.

Progress was made on the establishment of this new reserve during the month by field investigation and the setting of three forest monuments on the proposed boundary, two at the east end and one near the Kailua-Waimanalo gap. Field work on this project will be rushed so that the survey may be completed at an early date.

#### PROTECTION FROM TRAMPERS.

At the request of the Hawaiian Trail and Mountain Club I delivered a talk on "Hawaiian Forests and Trails" at a regularly assembled luncheon meeting of the club on April 28. This was printed in toto in the April 30 edition of "The Honolulu Star-Bulletin" and will appear in the delayed April "Forester." At the conclusion of the talk, the club unanimously voted to plan its excursions so as to interfere as little as possible with forest protection.

The opportunity is embraced at this time to remind the Commissioners that recommendations for giving greater protection to the most important watershed of the city on the higher mountain slopes back of Palolo and Manoa Valleys still await final action. These were submitted on April 19, 1920, in the form of a report accompanying a proposed Rule V of this Division. It is safe to say that forest conditions on this area are not being improved by continued tramping over it.

#### MAKIKI TRAIL.

As directed by the Board on March 23, I relocated the trail leading up from Makiki Valley to the Tantalus Ridge back of the Makiki Heights lots and also ran out a short-cut trail to connect up at the road junction with the trail leading up back of Lunalilo home. This new trail has been cleared and graded and is an improvement to the general trail system in this region.

#### PAMAKANI ON OAHU.

On April 28, I was informed by Mr. O. H. Swezey that he had seen the pamakani weed (*Eupatorium macrophyllum*) in Hahaione Valley, Maunaloa, Koolaupoko, Oahu. The spread of this weed, which has ruined many hundreds of acres of good grazing land on Maui, is so undesirable on Oahu that I at once informed Mr. George M. Collins of the Bishop Estate of the discovery and he in turn has asked the lessees of Maunaloa to extirpate this weed. Its presence at Maunaloa can be accounted for only by wind dispersal of the seed from Maui or Molokai.

#### MISCELLANEOUS.

Advice was given the Hawaiian Pineapple Company in connection with a shipment of yellow pine lug box shooks received from the coast in a badly stained condition.

A letter was sent by the President to the Governor suggesting cooperation with the U. S. Army so that airplane photographs may be taken of forest reserve areas.

A map of the Honuaula and Waiaha Spring Forest Reserves and surrounding lands in North Kona, Hawaii, is being compiled in the survey office for use on an investigative field trip to be undertaken in this region in the near future.

Respectfully submitted,

C. S. JUDD,  
Superintendent of Forestry.

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**REPORT OF THE ASSISTANT SUPERINTENDENT OF FORESTRY,  
APRIL, 1921.**

Honolulu, Hawaii, April 30, 1921.

Superintendent of Forestry,  
Honolulu, T. H.

Dear Sir:

I respectfully submit the following routine report of my work during April, 1921:

A considerable amount of time throughout the month was spent at miscellaneous work in the office, including correspondence and the continuation of work on the folio of forest reserve maps. Two days were occupied in compiling a reference list of all reports and proclamations relating to the forest reserves which have been published in the "Forester and Agriculturist." At the request of the Territorial Surveyor a separate list of all withdrawals and additions of land within the reserves was also prepared.

During the month two lots of seed of *Taraktogenos Kurzii*, one of the chaulmoogra oil trees, shipped from Burma by Mr. Rock, were carefully examined for insect infestation and all suspected seeds were burned. The seeds were received packed in sacks of pulverized charcoal, and were sown by Mr. Haughs immediately after inspection.

On April 7 and 16, in company with the Superintendent, I set forest boundary monuments to mark the extreme south boundary of the new Waimanalo Forest Reserve. These monuments are located respectively, on the crest of the Koolau Range near its south and on the talus slope at the foot of the pali immediately below the first monument. The lower pipe is mauka of the beach house of Mr. Charles S. Crane and is easily visible from the road or beach at that point.

On April 20 and 21, I accompanied the Superintendent on a trip to the Waianae and Lualualei Forest Reserves on Oahu. On this trip several pounds of tree seeds, chiefly *Ficus macrophylla*, were broadcasted from the lateral ridges of Puu Kaua in the hope of possibly reestablishing a forest cover in that vicinity. Just below the summit of this mountain, nine wild goats were killed, most of the meat being turned over to the native laborers of our forest planting crew at Waianae.

Several days were spent in preparation for the survey of the makai boundary of the Hilo Forest Reserve on Hawaii which is scheduled to begin early in May. Mr. Hockley has been assigned to the work from the Territorial Survey office and reached Hilo with his assistant on May 5.

On April 28, in the company of Mr. Atkinson and Mr. Fullaway, I left Honolulu on the "Matsonia," arriving the next morning in Hilo, where we were met by Ranger Ellis. The last two days of the month and the



first of May were spent making the circuit of the island of Hawaii. At Waimānā I arranged with Mr. Alfred Carter concerning the outplanting of the coniferous trees raised for us at the Kēanākolu sheep station of the Parker Ranch. While passing Hualālai we collected several flowering specimens of *Kokia rockii* and also took cuttings for the nursery at Hilo.

At this writing the planting of the conifers in upper Laupāhoehoe is well under way, the work being done by Ranger Ellis and three laborers; and a start has been made on the boundary survey to the extent of preliminary locations in the land of Punahoa.

Respectfully submitted,

CHAS. J. KRAEBEL,  
Assistant Superintendent of Forestry.

## REPORT OF THE FOREST NURSERYMAN, APRIL, 1921.

Honolulu, Hawaii, April 30, 1921.

Superintendent of Forestry,  
Honolulu, T. H.

Dear Sir:

I herewith submit a report of the work done during the month of April:

### NURSERY—DISTRIBUTION OF PLANTS.

	In transplant boxes	Pot grown	Total
Sold .....	...	63	63
Gratis .....	100	1,319	1,419
Total ....	100	1,382	1,482

### COLLECTIONS—GOVERNMENT REALIZATIONS.

Sale of plants, Government Nursery, Honolulu .....	\$ 2.15
Rent of Office Nursery Grounds for March .....	35.00
Total .....	\$37.15

### ANIMAL INDUSTRY REVOLVING FUND.

Sale of serum .....	\$21.15
---------------------	---------

### CHAULMOOGRA.

The two chaulmoogra oil bearing species introduced by Mr. J. Roek, who collected the seed while on his trip to India, are doing well and we are very hopeful that they may be grown successfully here.

### MAKIKI STATION.

The work at this station consisted of the usual routine, also going over the buildings and doing repair work, etc.

### HONOLULU WATERSHED.

During the month 500 Australian red cedar trees were planted on a sec-

tion of the forest about half way between the Makiki heights property and the halfway house on Tantalus. A great many of the trees in this section of the forest were uprooted during recent storms and we are filling up the gaps with the red cedar. Other work done consisted of making holes for koa at the top of Makiki Main Valley.

#### SUB NURSERIES.

Brother M. Newell reports the distribution of the following trees from the Nursery at Hilo, Hawaii, during the month of April:

	1,000 trees in seed boxes
	792 trees in transplant boxes
	72 trees pot grown
Total:	<hr/> 1,864

James Lindsay reports the distribution of the following trees from the Nursery at Haiku, Maui, and Molokai, during the month of April:

	2,150 trees in transplant boxes
	210 trees in tins
Total:	<hr/> 2,360

Joe Rita reports the distribution of the following trees from the Nursery at Kalaheo, Kauai, during the month of April:

	863 trees in tins
Total:	<hr/> 863

#### ADVICE AND ASSISTANCE.

The writer, at the request of people in and around the city, made calls and otherwise gave advice and assistance as follows:

Visits made .....	8
Advice given by telephone .....	6
Advice given to people calling .....	5

At the request of Col. Jones of the 44th Infantry, Schofield, the writer called and made suggestions in regard to the laying out of the grounds and planting trees, etc., around the new buildings.

Respectfully submitted,

DAVID HAUGHS,  
Forest Nurseryman.

## DIVISION OF ENTOMOLOGY.

## REPORT OF THE ENTOMOLOGIST, APRIL, 1921.

Honolulu, Hawaii, April 30, 1921.

Board of Commissioners of Agriculture and Forestry,

Honolulu, T. H.

Gentlemen:

During the month of April the insectary handled 24,500 pupae of the melon fly, from which the following were bred: 3662 females and 3307 males. *Opius fletcheri*.

The distribution of parasites was as follows:

## MELON FLY PARASITES.

*Opius fletcheri*

	Females.	Males.
Oahu:		
Wahiawa .....	800	700
Kalihi .....	500	500
Moliili .....	350	350
Waianae .....	400	350
Oahu Prison .....	300	300
Keeaumoku St. ....	200	200
Moanalua .....	400	400
Maui:		
Kihei .....	400	400
Hawaii:		
Kamuela .....	300	300

## FRUIT FLY PARASITES.

*Diachasma tryoni*

	Females.	Males.
Oahu:		
Kaimuki .....	150	150
Kalihi Valley .....	350	350
Nuuanu Ave. ....	100	100

*Diachasma fullawayi*

Oahu:		
Kaimuki .....	100	100
Kalihi Valley .....	225	210
Nuuanu Ave. ....	100	100

*Opius humilis*

Oahu:		
Kalihi Valley .....	50	50
Nuuanu Ave. ....	75	75

*Tetrastichus giffardianus*

Oahu:		
Kaimuki .....	...	500
Kalihi Valley .....	...	1,400

The Entomologist returned from the Orient on the 23rd of April with beneficial insects, which are being handled in the Insectary. From April 29 until May 2 he was on the Island of Hawaii investigating an outbreak of cutworms on the Parker Ranch.

Respectfully submitted, ,

D. T. FULLAWAY,  
Entomologist.

## DIVISION OF PLANT INSPECTION.

### REPORT OF THE CHIEF PLANT INSPECTOR, APRIL, 1921.

Honolulu, Hawaii, April 30, 1921.

Board of Commissioners of Agriculture and Forestry,  
Honolulu, Hawaii.

Gentlemen:

I herewith submit my report of the work carried on by the Division of Plant Inspection for the month of April, 1921, as follows:

During the month 48 vessels arrived at the Port of Honolulu, 25 of which carried vegetable matter and four came by way of the Canal. The following disposal was made of the various shipments:

Passed as free from pests .....	1281 lots	26,738 parcels
Fumigated with carbonbisulphide .	20 "	20 "
Burned .....	65 "	65 "
Returned .....	1 "	1 "
<hr/>		
Total inspected .....	1367 lots	26,824 parcels

Of these shipments, 26,354 parcels arrived as freight, 249 as baggage, and 221 as mail.

### RICE AND BEAN SHIPMENTS.

During the month, 34,266 bags of rice and 5251 bags of beans arrived from Japan and were passed as free from pests.

### PESTS INTERCEPTED.

Approximately 2987 pieces of baggage belonging to immigrants from foreign countries were examined, from which 31 lots of fruit and 19 lots of vegetables were seized and destroyed. A tabulated list of material intercepted, other than the above mentioned fruits and vegetables, follows:

#### Australia:

April 13—3 pkgs. tree seeds, baggage (Kushi), fumigated, precautionary.

April 13—16 pkgs. ficus seed, mail (Pemberton), to H. S. P. A., CS2 prec.

April 13—1 tree stump with dead white ant nest, baggage (Kushi), fumigated, precautionary. Sent to mainland April 30.

April 28—1 lot apples, baggage, burned, lepidosaphes sp.

April 28—1 lot corn, baggage, burned, prohibited.

#### China:



- April 5—1 lot medicinal bark, baggage, fumigated, precautionary.
- April 20—4 pkgs. dried bark, baggage, fumigated, precautionary.
- April 23—1 pot plant, baggage (Fullaway), burned, prohibited.  
Used on board for conveying parasites.

## Japan:

- April 5—1 lot apples and cypress leaves, baggage, burned, prohibited.
- April 5—1 lot caetus plant, baggage, burned, prohibited.
- April 11—1 pkg. plant, baggage, burned, prohibited.
- April 11—1 pkg. corn, baggage, burned, prohibited.
- April 11—1 pkg. herbs, baggage, fumigated, precautionary.
- April 11—1 pkg. chestnuts, baggage, fumigated, precautionary.
- April 23—1 lot corn, baggage, burned, prohibited.
- April 23—1 lot cocoanut, baggage, fumigated, precautionary.

## Java:

- April 11—1 pkg. seeds, mail for H. S. P. A., fumigated, weevils.

## Philippines:

- April 2—1 letter citrus seed, mail, burned, prohibited.
- April 5—1 pkg. tree seeds, mail (Williams), to H. S. P. A., CS2 prec.
- April 5—1 pkg. forage, grass, baggage (D. T. Fleming), turned over to Dr. Lyon. Quarantined under observation.
- April 11—1 pkg. betel nuts, baggage, burned, infestation.
- April 11—1 pkg. seeds, mail (Williams), to H. S. P. A., fumigated, weevils.
- April 20—1 pkg. rice paddy (also piece of ginger and two twigs), baggage, burned, prohibited.
- April 20—1 pkg. nuts, baggage, fumigated, precautionary.
- April 25—1 pkg. tree seeds, mail (Williams), to H. S. P. A., CS2 prec.

## Siam:

- April 5—1 pkg. tree seeds, mail (Rock), to H. S. P. A., CS2, precautionary.

## Singapore:

- April 23—1 pkg. tree seeds, baggage (Rock), fumigated, precautionary.

## United States:

- April 12—1 case plants, cargo, fumigated, *Pseudococcus maritimus*.

## BENEFICIAL INSECTS.

Following is a summary of the beneficial insects sent by Mr. F. X. Williams, now in the Philippines, to the H. S. P. A., received and inspected by me personally at the H. S. P. A. Experiment Station in the presence of Mr. Muir:

- U. S. T. Thomas, April 5—1 case Ficus benjamina trunks in sand and moss. Fruit removed, trunks and sand burned. Found white ant colony in one trunk.
- S. S. Colombia, April 12—2 pkgs. Fig insects and parasites for bean-pod butterfly.
- S. S. Creole State, April 25—2 pkgs. Figs containing fig insects.

## HILO INSPECTION.

Brother M. Newell, Inspector at Hilo, reports the arrival of nine vessels with five carrying vegetable matter consisting of 197 lots, and 5085 parcels. 2795 bags of rice and 160 bags of beans arrived from Japan, all clean.

## KAHULUI INSPECTION.

Mr. Louis Gillin, Inspector at Kahului, reports the arrival of eight vessels with two carrying vegetable matter, consisting of fourteen lots and 1918 parcels, all clean.

## INTER-ISLAND INSPECTION.

Sixty-one vessels plying between Honolulu and other Island ports were attended and the following shipments passed:

Taro .....	129 bags
Vegetables .....	127 packages
Fruit .....	226 packages
Plants .....	103 packages
Pineapple shoots .....	2048 bags
Seeds .....	7 packages
Sugar Cane .....	179 packages
Total passed .....	2819 packages

Thirty-two packages of plants, ten packages of fruit and two pieces of sugar cane were rejected on account of infestation, undesirable soil and non-compliance with the regulations.

## LOCAL FUMIGATION.

During the month the following fumigation was done for various local firms:

252 bags beans  
 2303 bags middlings  
 200 bags oats  
 100 cases tomatoes (badly infested with white ants)

Respectfully submitted,

E. M. EHRHORN,  
 Chief Plant Inspector.

## DIVISION OF ANIMAL INDUSTRY.

REPORT OF THE TERRITORIAL VETERINARIAN,  
APRIL, 1921.

Honolulu, Hawaii, April 30, 1921.

Board of Commissioners of Agriculture and Forestry,  
 Honolulu, T. H.

Gentlemen:

I beg to submit the following report for the month of April:

## TUBERCULOSIS CONTROL.

During the past month a total of 461 head of cattle were tested, of which number ten were condemned, branded and slaughtered. Lesions of tuberculosis were found in all.

## INFECTIOUS KERATITIS BOVIS.

At the time of making the tuberculin test at the Kualoa Ranch, a number of the cattle were noticed to be affected with a peculiar condition of the eye. In some, both eyes were affected with a more or less severe conjunctivitis. In all, eight cases were observed. The trouble was diagnosed as infectious keratitis. This is the first time in many years that this disease has been observed in the Territory.

The affected ones were treated with specific bacterins and are now completely recovered and the balance of the herd immunized against a recurrence of the disease.

## LIVE STOCK IMPORTATIONS.

For details on live stock importations see appended report of the Assistant Territorial Veterinarian.

The outstanding features of the importations for the month were two pure-bred, registered Ayreshire bulls, one for Geo. P. Cooke and one for H. P. Faye; two registered Holstein cows for Geo. R. Carter, and one registered Hereford bull for C. H. Bellina. Mr. Bellina also imported forty-one high grade Holstein cows for his dairy at Kuliouou.

Respectfully submitted,

L. N. CASE.  
Territorial Veterinarian.

---

**REPORT OF THE ASSISTANT TERRITORIAL VETERINARIAN,  
APRIL, 1921.**

Honolulu, Hawaii, April 30, 1921.

Dr. Leonard N. Case,  
Chief, Division of Animal Industry,  
Bureau of Agriculture and Forestry,  
Honolulu, T. H.

Sir:

I herewith submit report for the month of April, 1921:

## TUBERCULOSIS CONTROL.

The following cattle were tuberculin tested during the month:

	Tested.	Passed.	Condemned.
Antone Delgado .....	4	4	0
Geo. P. Cookt .....	1	1	0
H. P. Faye .....	1	1	0
Manuel Freitas .....	2	2	0
T. E. Robinson .....	2	2	0
Robert Hind .....	21	21	0
Kualoa Ranch .....	216	213	3
J. F. Nevis .....	23	20	3
Antone Ruis .....	6	6	0
F. M. Roha .....	5	4	1
On Young .....	146	144	2
R. Tomita .....	7	7	0
M. T. Bryzon .....	1	1	0
M. Salado .....	3	3	0
Y. Ogawa .....	9	9	0
C. Y. Sang .....	13	13	0
K. Minami .....	1	0	1
Total .....	461	451	10

Of the ten condemned cattle, eight head have been slaughtered and tuberculous lesions found in each. Besides the above, one cow, previously condemned, was slaughtered and found to be tuberculous.

### RABIES CONTROL.

The following dogs were given the anti-rabies treatment:

H. Russel .....	1
H. A. Clover .....	1
Capt. N. Borresen .....	1
C. S. Jackson .....	1
Sherwood Picking .....	1

### CANINE DISTEMPER VACCINATION.

The following dogs received canine distemper vaccine:

C. S. Jackson .....	1
---------------------	---

### INFECTIOUS KERATITIS.

An outbreak of infectious keratitis was investigated at the Kualoa ranch.

The eight existing cases were injected with Keratitis mixed bacterin. Later the whole herd, consisting of 251 head, were given the same treatment with the result that the affected animals are recovering and only a few new cases have been observed.

### LIVE STOCK IMPORTATIONS.

Of the thirteen steamers inspected, nine brought the following live stock:

#### S. S. LURLINE, San Francisco.

78 crates poultry .....	Various
1 crate ducks .....	American Railway Express
1 Ayreshire bull .....	Geo. P. Cooke
1 Ayreshire bull .....	H. P. Faye
18 mules .....	California Packing Co.
1 crate pigeons .....	California Feed Co.
1 hog .....	A. J. Campbell
1 parrot, 1 canary .....	M. I. Fairbanks
2 horses, 58 mules .....	Murphy Horse and Mule Co.

#### S. S. SHOBACK, Orient.

1 Chow dog .....	C. S. Jackson
------------------	---------------

#### S. S. KOREA MARU, Orient.

1 monkey, 9 crates pheasants, 13 crates doves, 1 crate assorted birds .....	D. T. Fleming
--	---------------

#### S. S. MAUNA KEA, Hilo.

2 cows, 1 calf .....	Manuel Freitas
----------------------	----------------



## S. S. MANOA, San Francisco.

2 crates turkeys .....	Raymond Ranch
63 crates poultry .....	Various
1 dog .....	H. A. Clover
1 dog .....	H. Russel

## SCH. COLUMBIA, Seattle.

1 dog .....	Capt. N. Borresen
-------------	-------------------

## S. S. LURLINE, San Francisco.

1 goat .....	American Railway Express
54 crates poultry .....	Various

## U. S. S. RAINBOW, San Francisco.

1 Chow dog .....	Sherwood Picking
------------------	------------------

## S. S. MAUNA KEA, Hilo.

1 cow .....	M. J. Bryzon
3 cows .....	M. Salado

## S. S. LURLINE, San Francisco.

2 cows .....	Geo. R. Carter
41 cows, 1 bull .....	C. H. Bellina
8 mules .....	Kilauea Plantation
9 horses .....	Laie Plantation

Respectfully submitted,

L. E. CASE,  
Assistant Territorial Veterinarian.











# THE HAWAIIAN FORESTER AND AGRICULTURIST

JUNE, 1921

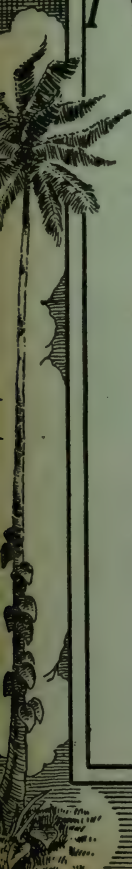
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(1921)

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# THE HAWAIIAN FORESTER AND AGRICULTURIST

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No. 6

## THE ALAHEE TREE.

By C. S. JUDD, *Superintendent of Forestry.*

One of the charming but little known of our small Hawaiian trees is the alahee, or walahee (*Plectronia odorata* Forst. F. v. M.). This is found in the dry regions at the lower elevations throughout the islands and is particularly noticeable because of its shining dark-green leaves, which resemble those of the maile vine (*Alyxia olivaeformis* Gaud). The tree is not peculiar to Hawaii, but is found also in Tahiti, the Fijis and in other islands of the Pacific.

First appearing as a low recumbent shrub, it grows very slowly into a small stiff tree, until finally it may attain a height of 25 feet and a diameter of eight inches. In middle life the alahee often has a pointed crown, which gives it the appearance of a Christmas tree, but as the tree becomes older the crown flattens out and becomes rounded.

The bright green elliptical leaves, which are very glossy on the upper surface but paler beneath, are arranged on the branchlets opposite to each other and are said to have been used by the ancient Hawaiians as a dye for coloring articles black.

About the first of June the trees are whitened with flat-topped clusters of very fragrant blossoms, to which honey bees are particularly attracted. The berry-like two-celled fruit resulting from the blossoms resembles somewhat a rough pea, but more closely a shining caper. Unfortunately it is attacked almost as soon as formed by the larvae of a small indigenous moth (*Ornecodes objurgatella* Wlsm.), so that uninjured seed is rarely found on the tree. The worm enters the berry between the two seeds and usually bores into each so that they will not germinate.

For this reason it is almost impossible to secure good seed for nursery use and the natural spread of the tree is also greatly hindered. Occasionally a march will be stolen on this natural enemy and enough good seed will be shed to produce a new crop of natural seedlings around the mother tree. About the only way to secure seedlings for distribution is to lift the naturally sown plants. These stand transplanting well and are an attractive ornament to any yard. In fact, the alahee would make a

very excellent hedge plant, because of its slow but persistent growth, stiff branches, bright green glossy leaves and fragrant blossoms. The latter, however, last for only about one week on the tree.

The tree in nature is usually found among rocks in very dry and sterile situations, and will stand any amount of exposure to strong winds. Very often it is the only arborescent growth found in dry localities. It comes up on desert lava flows and seems capable of spreading naturally on areas which are constantly pastured with stock. The shining dark green foliage of the alahee lends a pleasing contrast to the straw colored expanses of desiccated pili grass and to the gray hues of lichen covered rocks.

On account of its slow growth the alahee produces a wood which is not only heavy, hard and close grained, but is very tough and durable. It is of a light cream color and takes a very fine polish. On account of these excellent qualities the wood of the alahee was used by the ancient Hawaiians for two purposes. Out of it they made their implement for tilling the soil in the form of an "ō-o," a digger or narrow spade. Fornander's collection of Hawaiian folk-lore contains the following:

"Holo ka o-o alahee a ka mahiai."

Speedy is the alahee digger of the cultivator.

The other and most remarkable use made of the alahee wood was its conversion into the cutting blade of an adze. The Hawaiians made their axes, hatchets and pocket knives usually from the dark, heavy, close-grained basaltic stone, but occasionally, when the hard lava rock was not available, they used a sea shell, the ole, and the very hard wood of the alahee. The Hawaiians had the following saying:

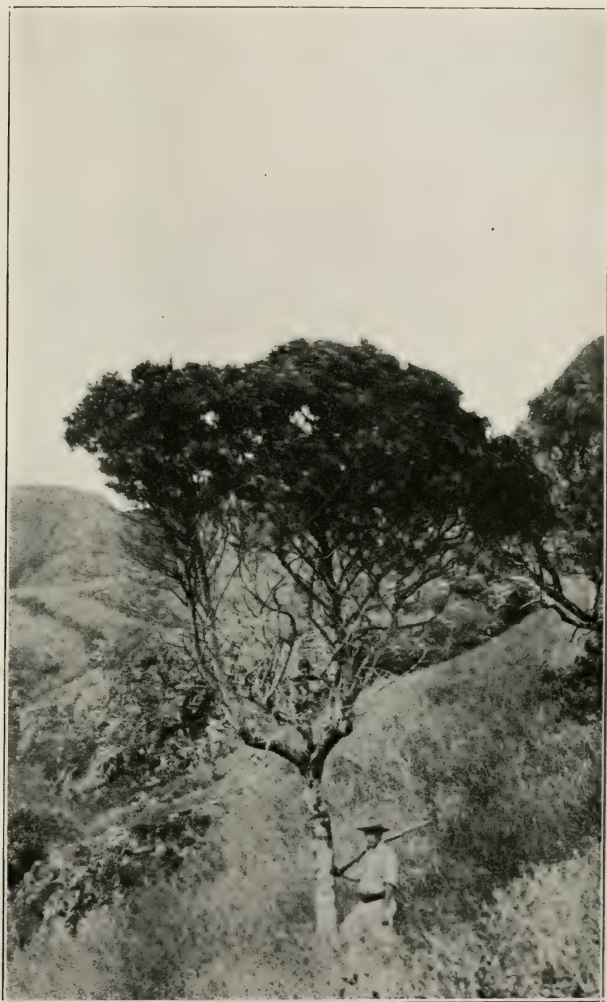
"O ka ole ke koi o kai,

O ke alahee ke koi o uka."

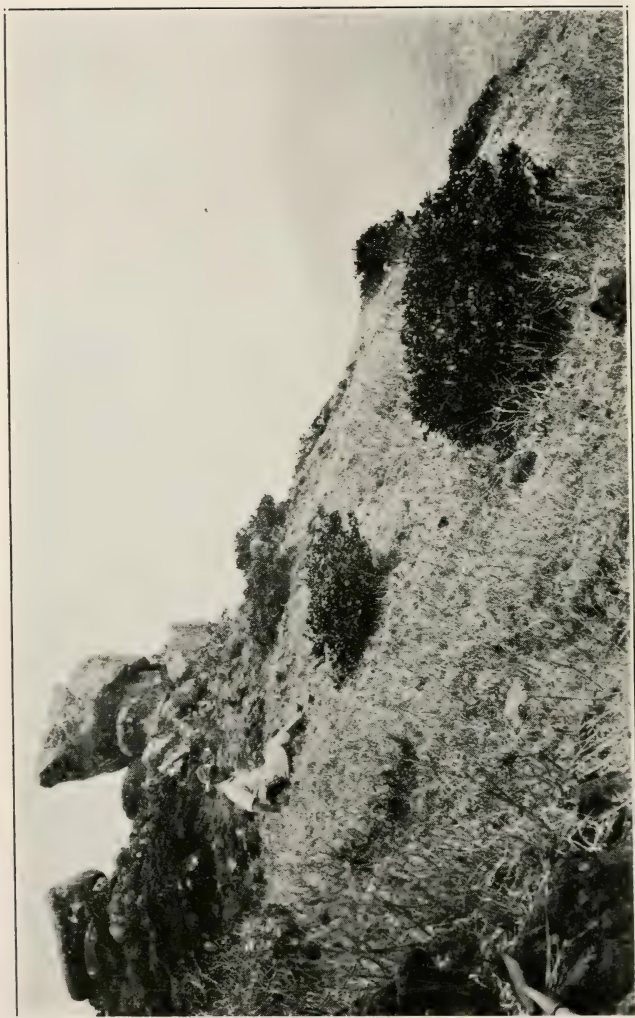
The ole is the ax of the shore,

The alahee is the ax of the inland.

Adzes made of the alahee were naturally not equal to the stone axes, but were useful in cutting the softer woods, such as hala-pépe, wili-wili, and kukui.



Alahee tree 25 feet high and 8 inches in diameter near  
Kolekole Pass, Waianae, Oahu.



Young alahoe trees spreading on grazing land at Maunaloa, Oahu.





Alahee tree on windswept cliff at Maunaloa, Oahu.

## TROUT IN HAWAII.

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Rainbow trout, introduced from Idaho in April, 1920, and liberated in the Kokee Stream in the Na Pali-Kona Forest Reserve, Kauai, at an altitude of 3500 feet, grew at the rate of one inch a month for the first six months and in June, 1921, some of them measured  $9\frac{1}{2}$  inches in length. The temperature of the water in this stream remains at about 60 degrees, which is cold enough for trout, and there seems to be an abundance of insects and other animal life for the trout to feed upon. Some of the fourteen months old trout already exhibit roe, but the Fish and Game Commission of the Territory will soon promulgate regulations which will protect them for another two years. In this manner the trout will become thoroughly established in the region and can then furnish good sport for the angler.

During June twenty-five thousand more rainbow trout young fry from Utah were liberated in the same stream and seemed to take to the new waters very much as if they were at home.

C. S. J.

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## FIRE HINTS.

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Take no chances with fire. Drop no burning matches or tobacco. If you have a camp fire, build it away from logs, trees, or rotten wood. Scrape a clean strip around it, digging down to the mineral soil. When you leave, put your fire out, every spark of it. If there is no water, use dirt.

Lightning and men start forest fires. The lightning can't help it. Be careful with fire in the woods, all the time.

The forest reserves of the Territory are the source of the streams which supply domestic and irrigation water to thousands of people. Destruction of the forests in these reserves by fire and other agencies means less water for home and plantation use.

A good woodsman always puts out his camp fire and cleans up his camp before he leaves.

C. S. J.

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## LIGHTNING AND FOREST FIRES.

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The time-worn theory that "lightning never strikes twice in the same place," has been modified by forest experts of the United States Department of Agriculture to this extent: Lightning very often strikes in nearly the same places. It has its zones, in other words, where its appearance may usually be counted on with each electrical storm.

With the accumulation of data on causes and locations of fires in the national forests, these lightning zones could be mapped out and protective measures introduced—such as fire

lines, regulated grazing and cleaning out of dead trees—which would more or less automatically control lightning fires at the start, the foresters believe. If these lightning zones were so mapped they would doubtless show a markedly close relation to certain types of topography, and sometimes more or less localized sections of many forests.

Next to campers and sparks from locomotives, lightning ranks third as the source of fires in the national forests. The records of the Forest Service of the department show that for the years 1914–1918, inclusive, lightning caused on the average 30 per cent of all fires reported. However, during 1920, a very unusual season, over 50 per cent of the 6,078 fires that occurred in the national forests were set by lightning.

### **SPLIT OR ROUND FENCE POSTS?**

Some people believe split fence posts last longer than do round ones. Probably as large a number hold the opposite view. The Forest Products Laboratory of the United States Department of Agriculture says that one will last about as long as the other if the percentages of heartwood and sapwood are the same in both. If the percentage of sapwood is increased by splitting, the split post will be less durable, while if the percentage of heartwood is increased it will be more durable than the round one. Exceptions to this should be made if the posts are of spruce, hemlock, or any of the true firs, whose heartwood and sapwood are about equally durable.

If the posts are to be treated with creosote or some other preservative, the round post is preferable to the split, because of the comparative ease with which the sapwood can be treated. Experiments at the laboratory demonstrate that the heartwood faces on split posts do not, as a rule, absorb the preservative as well as does the sapwood.

### **FIG INSECT INVESTIGATIONS.**

By D. T. FULLAWAY, *Entomologist*.

The investigations forming the subject of this report were carried on in conjunction with similar investigations in the Philippines, Fiji and Australia, and had as their object the utilization of certain trees of the genus *Ficus* (strangling figs, banyans, etc.) for reforestation in Hawaii. In these plants the flowers are enclosed in a fleshy receptacle and are completely dependent upon a single group of highly specialized insects for fertilization. With the exception of the *Blastophaga*, introduced for the Smyrna variety of the cultivated fig, none of these insects exist in Hawaii, and as they are absolutely necessary to a free and natural spreading of species of *Ficus*, it was decided to import them from the regions where they occur.

A large number of the figs growing in Hawaii have come

from the Orient. The list includes the Indian banyan, *Ficus bengalensis*; the Chinese banyan, *Ficus retusa*; *Ficus religiosa*, sacred fig of India; *Ficus elastica*, the well-known conservatory plant, which was also formerly planted for rubber; and the less known species *Ficus rumphii*, *Ficus benjamina*, *Ficus infectoria*, *Ficus macrophylla* and *Ficus hispida*. The writer, therefore, in December, 1920, was instructed to undertake a journey to China, the Malay Peninsula and India, in order to investigate these species in their respective ranges, and determine, as far as possible: 1. The most useful and desirable species of *Ficus* to propagate in Hawaii; 2. the agent or agents of fertilization, and the degree of strictness in the relationship between insect and plant; 3. the best method of transporting the insects.

Departing from Honolulu December 9, Hong Kong was reached on the 4th of January. At the Botanic Garden there, it was learned that three of the above-named species are common in Hong Kong and its vicinity, producing seedlings and therefore harboring fig insects. *Ficus elastica* was also represented in the Garden by several handsome trees, evidently planted. *Ficus retusa* is the most representative fig in Hong Kong, and at the time was in full fruit. An examination of figs collected on Kennedy Road disclosed fig wasps in the late pupal stage, nearly ready to emerge. Each fig contained close to a hundred fig wasps and a large number of inquilinous species as well. After rearing the insects from these figs and determining their relationship, large quantities of the figs were shipped to Honolulu in cold storage, from which fig wasps emerged on removal of the packages from the refrigerator at their destination. *Ficus hispida* is also very common in this locality, occurring along water-courses in Kowloon, the Chinese city on the mainland opposite Hong Kong. These plants are shrubby, have large, fleshy fruits, and are said to coppice freely. The species was considered undesirable on account of its weedy nature. *Ficus infectoria* is represented by many handsome trees, one particularly on the wall surrounding old Kowloon, and one in the Botanic Garden, fruiting in July.

Singapore was reached on the 27th of January. The common fig there is *Ficus rumphii*, which was in fruit at the time of my arrival; but as the result of certain experiments made plain the impossibility of carrying fig insects alive to Hawaii from points beyond Hong Kong, no shipments were made. This species is, moreover, considered objectionable on account of its harmful nature resulting from the germination of large numbers of seedlings on buildings. *Ficus retusa* was also common about Singapore, with insects present in the fruits. Other species observed were *Ficus benjamina*, *Ficus infectoria*, *Ficus bengalensis*, *Ficus elastica* and *Ficus macrophylla*, but they were either without fruit or the fruit disclosed no insects.

Calcutta was reached on February 8. The common species in this locality are *Ficus bengalensis* and *Ficus religiosa*. The



former was bearing sparingly and fruits collected yielded insects. Trees of *Ficus elastica* in the city were entirely barren, and at the Botanic Garden it was learned that this species is fertile only in the sub-Himalayan region, specimens found further south all being examples of cultivation. As Mr. Rock, our consulting botanist, was going into the region where this species is indigenous, he kindly undertook to investigate it, and informed me later that it fruits in July and August.

In compliance with the additional instruction to renew the search for the fruit-fly parasite *Syntomosphyrum indicum*, a visit was made between the 11th and 15th of February to the Agricultural Research Institute at Pusa, Bihar, where the leading entomologists of the Indian Empire were found in conference. On the way to Pusa, *Ficus religiosa* was observed fruiting at Mokamah Ghat, and fruit collected yielded insects. At Pusa, the Imperial Entomologist, Mr. Fletcher, pointed out to me the harmful nature of the two common and widespread Indian figs, *Ficus bengalensis* and *Ficus religiosa*. Not only were buildings invaded by the seedlings of these species, but large trees, valuable for their fruit or shade, were attacked and destroyed by them. The conviction was reached here, after reflecting on my own observations and the information furnished by my experienced colleague, that these and similarly constituted species cannot be safely experimented with, and therefore no effort was made to secure their introduction. Low temperatures were still being experienced at Pusa during my visit and fruit fly activity was consequently at an ebb. The only fruit available at the time was the jujube, which contained a fruit fly, *Carpomyia vesuviana*, parasitized by a braconid, *Biosteres carpomyiae*. The advice given by the Imperial Entomologist was to go south to Coimbatore, where, in spite of the season, it was thought possible that ripe guavas might still be found. Accordingly, the journey was undertaken in company with Mr. Edward Ballard, government entomologist in the Madras Presidency, and after four days' travel by train, Coimbatore was reached on the 18th of February. The locality and season there proved entirely unsuited to fruit-fly work. Again, the jujube was the only fruit obtainable, and a visit to the hill-station at Burliar, 60 miles from Coimbatore, was unencouraging. A handful of ripe guavas was secured, but none of them harbored maggots. The next move was to Bangalore, in Mysore State, where Compere obtained *Syntomosphyrum indicum* originally. The prospect at this time, however, was not very alluring, as advices received in Coimbatore were that the season was too far advanced for fruit-fly work. On arrival a temporary laboratory was arranged at the Agricultural Department, and a systematic search for fruit instituted, with the assistance of three native employes of the Agricultural Department. The country for twelve miles around was scoured for fruit without appreciable result. Not more than a dozen infested cucumbers could be

secured in the whole length of my stay in Bangalore, and these did not even produce *Opius fletcheri*. The *Ziziphus* trees, in the compound of Dr. Coleman, the Director of Agriculture in Mysore, furnished a quantity of infested fruit, from which parasites were reared, and as nothing else seemed obtainable for months, in view of the dry conditions prevailing, which were expected to continue until the summer monsoon set in, preparations were made to depart with the jujube fruit-fly parasites then in hand.

While on the subject of *Syntomosphyrum indicum*, it is desired to call attention to the obscurity which surrounds this much-sought insect. On my previous visit to India, the object was to secure natural enemies of the melon-fly, *Bactrocera cucurbitae*, and consequently my efforts were confined entirely to the rearing of this insect under conditions which would enable me to discover its parasites. After two months' work, during which no sign of Compere's parasite appeared, the elimination of *Bactrocera cucurbitae* as a host seemed evident. The result of this year's search furnishes no criterion, as it was not possible, as wished, to experiment with other species of fruit-flies found at Bangalore, owing to the dearth of fruit. It seems to me, however, that the only logical view to hold with regard to this parasite is, that it is attached strictly to some one of the many species of fruit-fly existing in India, besides *Bactrocera cucurbitae*. The insect is unknown to any of the Indian entomologists, although fruit-flies have been the subject of investigation for some years. A careful study of Compere's report would indicate that he himself did not know the host of his parasite, for though the insect was secured in a guava orchard, all sorts of fruits were brought into the orchard from the outside, and the pupae secured from the different fruits, representing, no doubt, several species, were evidently mixed in packing, so that the parasites which emerged later may have come from any one of them. The correct way to go about recovering *Syntomosphyrum indicum*, therefore, it is believed, is to investigate methodically the parasitism of each of the different species of fruit-flies found in the neighborhood of Bangalore; but this would require many months' careful and painstaking work, which the government will probably not care to undertake.

Before leaving Bangalore, a new method of transporting fig wasps, viz., in fruiting marcotted plants, was communicated to me from the Philippines by Dr. Williams, and as it seemed particularly applicable to the transportation of the Indian species of wasps, an engagement was entered into with the Superintendent of the Maharajah of Mysore's estates and Bangalore Botanic Garden, Mr. G. H. Krumbiegel, to have marcottings of *Ficus elastica* made by one of his assistants in the Teesta Valley or in Assam, according to advices from his agents in the north

as to the most suitable locality, and further, to have such plants as bore fruit shipped to us in wardian cases in care of the Pacific Mail Steamship Company from Calcutta.

At Hong Kong, *en route* to Honolulu, a similar arrangement was made with Mr. H. Green, Superintendent of the Hong Kong Botanic Garden, who had been requested by telegraph from Madras to commence layering *Ficus retusa* immediately on receipt of my wire. Mr. Green has not only consented to ship us fruiting plants of *Ficus retusa*, but has undertaken to collect and forward detached fruits in cold storage throughout the summer. The question, whether the attention the plants are likely to receive from ships' servants will be adequate, or whether it will be necessary to employ someone familiar with horticultural practices to accompany the shipments, has not yet been raised, but this detail should be duly considered. In fact it will be necessary to give close attention to all the details of these cooperative undertakings, if success is to be attained.

Very few figs could be found in Hong Kong on my return, and these were more or less immature, but an experiment was made with a few fruiting branches cut the day previous to my departure, of carrying the insects in the developmental stage, in the figs attached to these branches, the stems of which were immersed in water immediately on boarding the steamer. These cuttings remained fresh until Japan was reached, a week later, but soon after they began to wither. The figs were then detached, packed in tubes with moss, and placed in cold storage. No insects emerged after reaching Honolulu, so this method of transportation cannot be recommended, but at the time it was used it appeared worthy of trial.

It is considered most fortunate that the marcotting plan was promptly adopted, as it has been learned since reaching Honolulu, that the lack of results so far experienced from the wasps liberated here, may be attributed to the deterioration of the pollen in the detached figs in which the insects are conveyed. This should not occur in the figs on vegetating plants. In view of the proved feasibility of transporting alive both plants and insects by the methods experimented with, it may reasonably be expected that within a relatively short time the most suitable and desirable of the Oriental species of *Ficus* will be propagating themselves naturally in Hawaii.

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By Authority.

**TERRITORY OF HAWAII.**

**BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY.**

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**Permits to Start Fires Required.**

Notice is hereby given that, in accordance with Section 497, R. L. H. 1915, IT IS FORBIDDEN to start fires to clear land, including the burning of fallows, stumps, logs, brush, dry grass or fallen timber, for the period from May 1 to December 31, 1921, on any land in that part of

East Hawaii from Waipio Valley to Kau, unless written permission has first been obtained from the local District Fire Warden. The law requires that "Such fires shall not be started during a heavy wind or without sufficient help present to control the same and the fire shall be watched by the person setting the same, or by competent agents of his, until put out."

The District Fire Wardens for East Hawaii are: W. P. Naquin, Honokaa, from Waipio Valley to Koholalele; D. S. Macalister, Kukaiau, from Kukaiau to Manowaialee; John M. Ross, Hakalau, from Ookala to Kaupakuea; J. J. Ignacio, Papaaloa, for the land of Laupahoe; J. T. Moir, Papaikou, from Makahanaloa to Paukaa; James Henderson, Hilo, from Kikala to Waiakea, inclusively; and A. J. Watt, Olaa, for Puna.

C. S. JUDD,  
Chief Fire Warden.

Honolulu, T. H., April 20, 1921.

By Authority.

**TERRITORY OF HAWAII.**

**BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY.**

**Forest Reserve Hearing.**

Notice is hereby given that under the provisions of Chapter 37, R. L. H. 1915, a public hearing will be held by the Governor of Hawaii and the Board of Commissioners of Agriculture and Forestry on TUESDAY, the 28th day of June, 1921, at 2 o'clock p.m., in the office of said Board at the Government Nursery, King Street, Honolulu, T. H., to consider the withdrawal of land from forest reserves, more particularly as follows:

1. Island of Oahu, District of Honolulu, withdrawal of 4.53 acres of land from the Honolulu Watershed Forest Reserve on Makiki Heights.
2. Island of Oahu, District of Honolulu, withdrawal of 39,665 square feet of land from the Honolulu Watershed Forest Reserve near the Makiki-Round Top lots.
3. Island of Oahu, District of Waianae, withdrawal of 465 acres of land from the Makua-Keaau Forest Reserve in Keaau.

Maps and descriptions of the said lands are on file in the office of the Superintendent of Forestry, where they are open to the inspection of the public. At the said time and place all persons who so desire will be given full opportunity to be heard upon the subject matter of this notice and to present evidence and arguments in person, by proxy, or by letter, either for or against the withdrawal of said lands from said reserves.

C. J. McCARTHY,  
Governor of Hawaii.

The Capitol, Honolulu, T. H.,  
June 13, 1921.



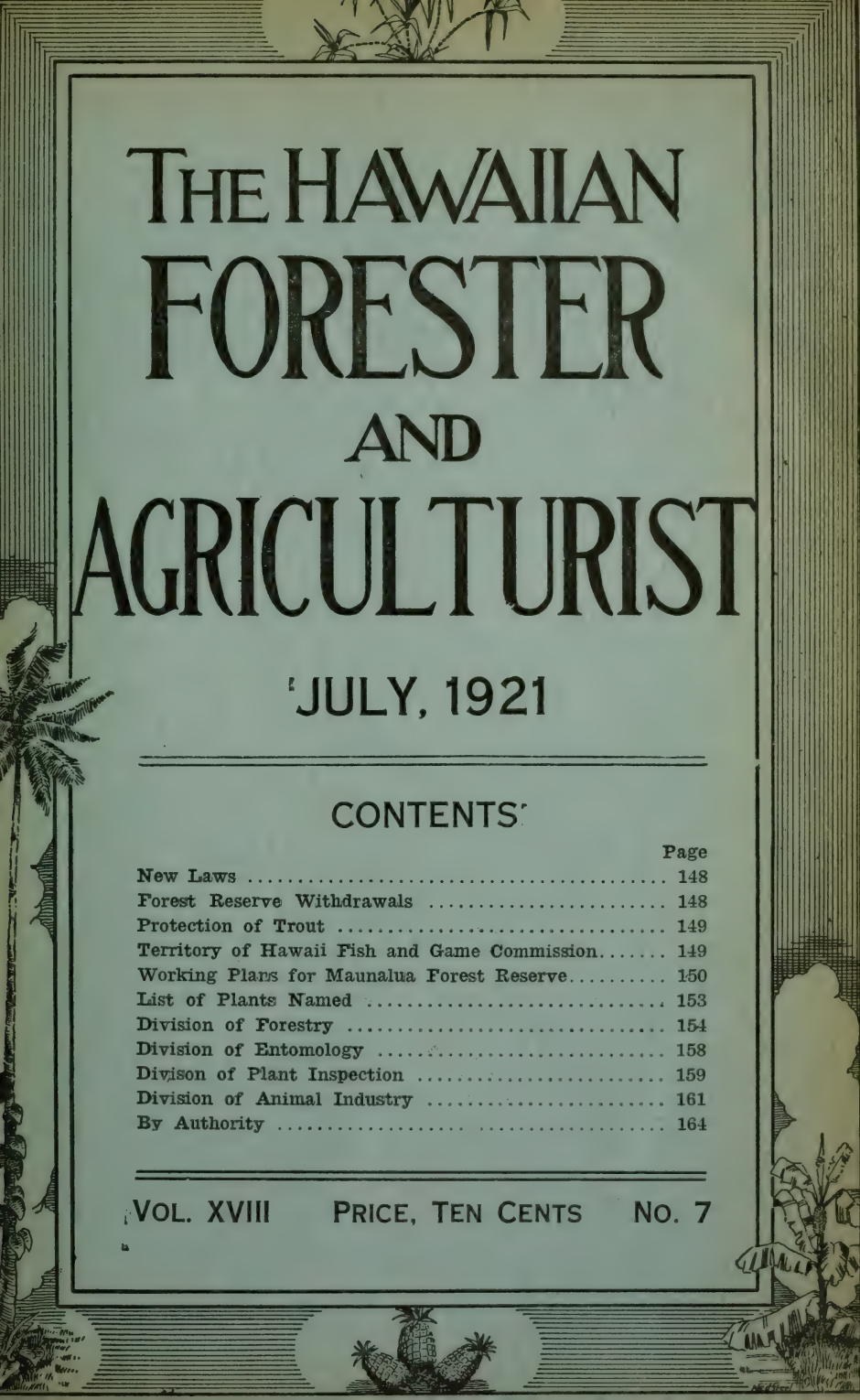












# THE HAWAIIAN FORESTER AND AGRICULTURIST

JULY, 1921

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Entomology, Animal Industry  
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# Board of Agriculture and Forestry

## DIVISION OF FORESTRY.

### FOREST AND ORNAMENTAL TREE SEEDLINGS FOR SALE AT GOVERNMENT NURSERIES.

The Division of Forestry maintains the following nurseries on the several islands from which seedlings of the common forest and ornamental trees may be obtained at cost:

**KALAHEO, KAUAI.** Nursery at Papapaholahola Spring Reserve in charge of Joe Rita, Jr., Kalaheo.

Trees for planting on Windward Kauai may be obtained from the Kapaa School by applying to Mr. Geo. S. Raymond, Principal.

**HONOLULU, OAHU.** Government Nursery, King Street, in charge of Forest Nurseryman David Haughs, Box 207, Honolulu. Fresh tree seed may also be obtained from this nursery.

**HAIKU, MAUI.** Nursery in charge of Forest Ranger James Lindsay, Haiku.

**HILO, HAWAII.** Nursery at the Boys' Catholic School in charge of Bro. Matthias Newell, Hilo.

**PRICES:** Plants in seed boxes \$1.00 per 1000. Transplants in boxes 1c each. Transplants in pots 2½c each.

C. S. JUDD,  
Superintendent of Forestry.

## DIVISION OF ENTOMOLOGY.

To give information about insects free of charge is one of the duties of this Division, and Hawaiian readers are hereby invited to make inquiry in person and by mail. In order to be able to advise intelligently or send the right kind of useful insects for relief, we like and sometimes it is indispensable for us to see the insects suspected or caught in the act, also specimens of the injury. In a tin with a hole or two, or a wooden box, specimens may be mailed by parcels post. When specimens are not accompanied by letter, always write your name and address in the upper left-hand corner of the package. Address all communications, DIVISION OF ENTOMOLOGY, P. O. BOX 207, HONOLULU, HAWAII.

D. T. FULLAWAY,  
Entomologist.

## PUBLICATIONS FOR DISTRIBUTION.

The Board of Commissioners issues for general distribution to persons in the Territory, annual reports, bulletins, circulars, copies of its rules and regulations, and other occasional papers, which may be had, free, upon application.

A complete list of the publications of the Board available for distribution (together with the titles of certain issues now out of print) is to be found on the cover of the last biennial report.

Applications for publications should be addressed to the Mailing Clerk, P. O. Box 207, Honolulu, Hawaii.



# THE HAWAIIAN FORESTER AND AGRICULTURIST

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VOL. XVIII.

HONOLULU, JULY, 1921.

No. 7

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A list of the acts of the 1921 Session of the Territorial Legislature affecting the Board of Agriculture and Forestry is contained in this issue.

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Attention is called to Rule 1 of the Territorial Fish and Game Commission, printed in this issue, for the protection of trout in the mountain streams on the island of Kauai.

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Progress was made during the month of May on the project of enlarging the Hilo Forest Reserve on the island of Hawaii by the survey and monumenting of ten miles of boundary.

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A description of the small forest reserve of 56 acres in Maunaulua near the eastern end of Oahu which the B. P. Bishop Estate has decided to set aside and protect is contained in this issue.

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During the month of June several hundred of the parasites on the fern weevil which were recently introduced from Australia were taken up to Hawaii and liberated in and near Hilo.

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Of the 85 head of cattle tested for bovine tuberculosis during May, not one was found to have the disease. Out of a total of 1171 head of dairy cattle tested to date during 1921, only 14 have reacted to the test.

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A steam soil sterilizer was installed at the Hilo nursery in May. This will eliminate insect life in the soil as well as prevent weed seeds from germinating, thus preventing loss of seedling trees by insect damage and economizing on labor spent for weeding.

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The planting of over 2000 Benguet pine seedlings (*Pinus insularis*), a timber tree of the Philippines, at the elevation of 6000 feet on the slopes of Mauna Kea should determine definitely whether timber may be grown successfully at the higher elevations in this Territory.

AUG 1 1921

## NEW LAWS

The following new laws, in which this Board is interested, were passed at the regular session of the 1921 Legislature:

- Act 128, Relating to the prevention, suppression and eradication of bovine tuberculosis and providing for the indemnification of owners of cattle destroyed pursuant to its provisions. Amending and reenacting Act 204. S. L. 1919. Appropriates \$30,000.
- Act 196, Providing for the transfer to the Bishop Museum of certain specimens and objects.
- Act 201, Relating to the vacation of public employees. Three week's vacation for each year.
- Act 222, Relating to assistant executive officers and removal of cattle from forest reserves.
- Act 229, Regular appropriation for the work of the Board \$240,680.

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## FOREST RESERVE WITHDRAWALS

On June 28, 1921, Governor McCarthy signed a proclamation withdrawing 5.44 acres of land from the Honolulu Watershed Forest Reserve on the island of Oahu.

The land withdrawn, consisted of two parcels. One is on Makaki Heights just back of the lots that were sold in that region some years ago and at the lower end of the eucalyptus forest and consist of 4.53 acres. The land was withdrawn at the request of the Commissioner of Public Lands who stated in his application to the Board:

"There is an incessant demand for residence lots in this vicinity and this change will enable me to put four or five lots on the market without injury, I believe, to the Forest Reserve."

This withdrawal was approved by the Board on May 20, 1921, on the ground that the land was more valuable for residence lots than for the conservation of water and should, consequently, be put to its highest use.

The other, approved also by the Board on May 20, 1921, is situated in an angle of the road leading to Round Top and consists of 39,665 square feet of a very steep sloping sand bank of no use for forest purposes. This also was withdrawn at the request of the Commissioner of Public Lands who desired the land for exchange purposes.

At the public hearing held on June 23, 1921, to consider these withdrawals no one appeared to object to the proposed action.

C. S. J.

## PROTECTION OF TROUT.

The Fish and Game Commission of the Territory has recently promulgated the following rule for the protection of the introduced trout which are doing so splendidly on the island of Kauai, as pointed out in the June FORESTER. All true sportsmen will zealously observe this rule. All others are earnestly urged not to violate it but to give the trout a chance to get thoroughly established.

TERRITORY OF HAWAII FISH AND GAME  
COMMISSION

Pursuant to the provisions of Act 72, Session Laws of 1921, the following rules and regulations are hereby promulgated by the Fish and Game Commission of the Territory of Hawaii:

*Rule 1.—For the Protection of Trout*

Section 1. It is hereby declared unlawful for any one at any time prior to July 1, 1923, to fish for by any means whatsoever, or to take, kill, or have in his or her possession any rainbow or other variety of trout taken from the Kokee, Kauaikinana, Kawaikoi, Waiaikoali, Mohihi, or any of their tributaries, which streams are all tributary to the Waimea River situated on the Island of Kauai.

Section 2. It shall not be unlawful for any officer of the Territorial Fish and Game Commission to take or have in his possession any of these trout when taken for scientific or experimental purposes.

Section 3. Every person violating any of the provisions of this rule shall be deemed guilty of a misdemeanor and upon conviction thereof shall be punished by a fine of not to exceed \$100.00, or by imprisonment in the county jail of not to exceed 30 days, or by both fine and imprisonment; and all moneys collected by such fines shall be turned over to the Fish and Game Commission to be used in helping to enforce the fish and game laws.

Adopted on May 17, 1921, by the Fish and Game Commission.

H. L. KELLY,  
Executive Officer.

Approved this 23rd day of June, 1921.

C. J. McCARTHY,  
Governor of Hawaii.

Honolulu, T. H.

## WORKING PLAN FOR MAUNALUA FOREST RESERVE KOOLAUPOKO, OAHU.

### INTRODUCTION.

At the informal request of A. F. Judd, Esq. a Trustee of the Bernice P. Bishop Estate, the following plan has been prepared for the protection of the remaining native forest and the re-forestation of denuded areas in the Maunalua Forest Reserve in the District of Koolaupoko, Island of Oahu, Territory of Hawaii.

### LOCATION AND TOPOGRAPHY

The land under discussion consists of 56 acres at the upper end of Kaalakei Valley in Maunalua, Koolaupoko, Oahu, with the Kuliouou Forest Reserve on the west and the steep Waimanalo Pali on the north. The lowest point on the area is 1300 feet and the highest point 2020 feet above sea level. The land is naturally divided into five small "hanging" valleys, that is, eroded gulleys which are separated from the land below by cliffs.

### FOREST DESCRIPTION

The largest and most heavily forested valley is at the west side of the reserve and in this there is a small stream of water which it is believed runs perpetually. Toward the east end of the reserve the forest lessens in density and on the easternmost boundary ridge there are scarcely any trees.

The reserve embraces the easternmost indigenous wet forest on the island of Oahu which is worth preserving for its scenic value, if for no other purpose. It is situated in a position which, in general, is exposed to the strong trade winds. A forest cover in this region is very essential for preventing soil and wind erosion and if the remaining forest on this area should be destroyed, the protecting influence which it has on the forests to the west would be lost and the general forest line would be pushed further to the west. To prevent this, is one of the main purposes which this reserve will serve.

The preponderant tree in this reserve, as in other wet forests, is ohia lehua with the usual undergrowth of amau and other ferns, maile and ie-ie vines, naupaka, lobelia, ti and other bushes. The bulk of this occurs in the north-west corner of the reserve almost as a pure stand. Toward the south-west corner down the ridge other species of trees, which naturally occur in drier situations, are encountered. These are represented in fewer numbers by the olapa, mamaki, lama, kopiko olopuu and iliahi. These all occur in the region of settling clouds between the elevations of 1500 and 2000 feet.

Toward the east end of the reserve the vegetation grows more scanty because of shallow soil and exposure to strong winds and only kukui and ti are found in the protected pockets of good soil.



In the bottom of the main small valley, on the west side of the reserve where running water is found, there are clumps of wild native bananas growing almost to the top of the Waimanalo pali. Just below the main belt of amaumau fern vegetation a clump of alligator pear trees, quite old, occupies the valley bottom together with tall introduced banana trees. Below this among the kukui trees is a large clump of awa with Chinese bananas, ape and taro plants. These seem to indicate the frequent presence of human beings on the area in the past.

Below the lower line of the present forest in this same valley, forest denudation by stock has been followed by an invasion of lantana, oi weed, guava and Hilo grass. In protected spots a few ohia lehua, alahee, and olopua trees still remain. The presence of landshells in abundance on the lantana and oi bushes, on ohia lehua, and on ti and awa would seem to indicate that the region is permanently moist.

#### FOREST DESTRUCTION

Cattle from the Maunalua Ranch which for some years past have worked into the valley from the south-east and south-west corners of the reserve have been almost entirely responsible for the destruction of the native forest on a area of at least nine acres. By their frequent travels to the land the cattle have worn such distinct trails on the hillsides that they almost appear to have been graded by human hands. The results of stock depredations are distressingly apparent. The stream-bed is one soggy mass of hoof prints, the awa patch is threaded with trails which lead to an impassable cliff up the valley beyond which the cattle fortunately have not been able to pass, and the ie-ie vines on the side hills appear as if clipped with a scythe. This destruction will continue and the forest will keep on receding until all stock is kept out.

Wind is a second cause of damage in this region because of aeolian erosion. A quarter mile below the reserve, the soil is being blown away by the strong trade winds on the top of Maunalua-Kuliouou ridge at the rate of two feet per year. In this particular valley the main wind exposure is from an eddy of the regular trade winds which blows toward the north-west. Damage from this source will be much lessened when the forest is reestablished. A windbreak should be planted on the boundary across the flat shown in Fig. 1.

The north side has been damaged by goats to only a very small extent and the danger from this source may be considered negligible as most of the wild goats have been exterminated and the last one will no doubt be killed before long.

#### FOREST PROTECTION

To give this forest adequate protection against stock it is advised that fences sufficient to keep the cattle out be constructed

where necessary. Most of the south boundary is naturally protected by a series of cliffs which are impassable to stock but one stretch across the flat-topped ridge 350 feet in length, and another on the east boundary on the ridge from the impassable cliffs to the Waimanalo pali 1200 feet in length should be fenced. The use of American fencing No. 958 with wire stays 12 inches apart and netting 58 inches high stretched on redwood posts set 15 feet apart and properly braced is advised. Such a fence is durable and is guaranteed to be much more stockproof than the ordinary five wires with wooden spreaders. The total cost of these two stretches of fence aggregating 1550 feet is estimated at \$439.40.

### FOREST PLANTING

For the present, planting on the east side of the reserve is not advised because of adverse conditions due to shallow soil and wind exposure. A large part of this will probably be self-sown with native plants after it is given adequate protection.

The reforestation of the nine acres of the denuded area, at the west side of the reserve, however, is advised not only so as to act as a protection to the remaining forest but also to conserve the source of water for it is believed that with stock kept out and this area covered again with forest, there will be much more water available for use.

This area, in need of planting, lies between the elevations of 1300 and 1500 feet and is situated on the lower slopes of the largest valley in the reserve. For the windbreak just above the proposed fence the swamp mahogany is advised for quick results. For general planting the following trees are suggested, aulu, olopuu, lama, and waiawi guava on the drier portions at the lower end and through the main portions of the area. Scattered among these a few Moreton Bay fig and Cook pine trees could be used to advantage to give the forest height and added protection. The Burma bamboo could well be planted where it is necessary to hold the soil and cuttings of ti plant inserted in the soil to start an undergrowth. It is believed that orange trees and Queensland nuts would grow very well here. It would at least be an interesting experiment and not costly to plant a few along with the other trees.

In general, the trees should be set 8 by 8 feet apart and with this spacing 6,120 trees will be required. The ground should be cleared of brush and the holes dug far in advance of planting. Transplants in tins should be used and be ready on the ground for immediate planting as soon as the regular rains have made soil conditions the most favorable for successful tree planting. It is estimated that the total cost of reforesting the most necessary portion will amount to \$979.20.

### CONCLUSION.

This report is followed by a detailed estimate of the cost of

fencing and planting, a list of names of plants (with their scientific equivalents) used in this report, four photographs and a map of the reserve.

C. S. JUDD,  
Superintendent of Forestry.

Honolulu, June 30, 1921.

## MAUNALUA FOREST RESERVE

### *Cost of Fencing.*

Total length to be fenced, 1550 feet.	
Posts 15 ft. apart, 104 post required at 70c	\$ 72.80
100 rods (5 rolls) of No. 958 American fencing at \$2.30	230.00
20 lbs. staples at 8c	1.60
Hauling wire and posts to trail	25.00
Packing wire and posts up mountain	60.00
Setting posts and stretching wire	50.00
	<hr/>
	\$439.40

### *Cost of Planting*

Total area to be planted, 9 acres	
Spacing 8 x 8 feet—680 trees per acre	
6,120 trees required at 2c original cost	\$122.40
Hauling and packing 6,120 trees at 2c	122.40
Clearing and planting 6,120 trees at 12c	734.40
	<hr/>
	\$979.20

## LIST OF PLANTS NAMED IN THIS REPORT

Alahee .....	<i>Plectronia odorata</i>
Alligator pear.....	<i>Persea gratissima</i>
Amaumau fern .....	<i>Sadleria cyatheoides</i>
Ape .....	<i>Alocasia macrorrhiza</i>
Aulu .....	<i>Sapindus Oahuensis</i>
Awa .....	<i>Piper methysticum</i>
Banana .....	<i>Musa spp.</i>
Burma bamboo .....	<i>Dendrocalamus strictus</i>
Chinese banana .....	<i>Musa Cavendishii</i>
Cook pine .....	<i>Araucaria Cookii</i>
Guava .....	<i>Psidium Guayava</i>
Hilo grass .....	<i>Paspalum conjugatum</i>
Ie-ie vine .....	<i>Freycinetia arborea</i>
Iliahi (Sandalwood) .....	<i>Santalum freycinetianum</i>
Kopiko .....	<i>Straussia sp.</i>
Kukui .....	<i>Aleurites moluccana</i>
Lama .....	<i>Maba sandwicensis</i>

Lantana .....	<i>Lantana Camara</i>
Lobelia .....	<i>Lobelioideae</i>
Maile .....	<i>Alyxia olivaeformis</i>
Mamaki .....	<i>Pipturus albidus</i>
Moreton Bay fig .....	<i>Ficus macrophylla</i>
Naupaka .....	<i>Scaevola Chamissoniana</i>
Ohia lehua .....	<i>Metrosideros collina polymorpha</i>
Oi weed .....	<i>Verbena bonariensis</i>
Olapa .....	<i>Cheirodendron Gaudichaudii</i>
Olopua .....	<i>Osmanthus sandwicensis</i>
Orange .....	<i>Citrus Aurantium</i>
Swamp mahogany .....	<i>Eucalyptus robusta</i>
Taro .....	<i>Colocasia antiquanrum</i>
Ti .....	<i>Cordyline terminalis</i>
Queensland nut .....	<i>Macadamia ternifolia</i>
Waiawi guava .....	<i>Psidium Guayava pyrifera</i>

## DIVISION OF FORESTRY.

### REPORT OF THE SUPERINTENDENT OF FORESTRY, MAY, 1921.

Honolulu, Hawaii, May, 31, 1921.

Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.:

Gentlemen:—I respectfully submit the following report of the Division of Forestry for the month of May, 1921:

#### TREE PLANTING.

Tree planting activities were extended to the island of Hawaii, where during the first part of the month, on the government land of Laupahoehoe, at an elevation of approximately 6,000 feet, within the Hilo Forest Reserve, Ranger V. L. Ellis, with a few laborers, planted out 2,200 Benguet pine trees (*Pinus insularis*). This is a timber tree of the Philippines and the seedlings were raised at Keanakolu in cooperation with the Parker Ranch.

On Oahu, 495 koa and 553 Australian red cedar trees were planted in Makiki in the Honolulu Watershed Reserve, and 300 koa and 3,418 ironbark (*E. crebra*) were planted at Mikilua in the Lualualei Reserve. Planting activities in May resulted in the planting out of a total of 6,966 trees.

During an inspection trip in the Kuliouou Reserve, Oahu, on May 21, several pounds of fresh seed of logwood and silk oak were broadcasted on bare soil. It was raining at the time, so that conditions were very favorable for success.

#### FOREST FENCING.

Boundary fences to protect forest reserves received attention during the month and amounted to 2.84 miles, as follows:

##### Fences Repaired:

Kauai, Moloaa Reserve .....	572 feet or	.11 miles
Oahu, Lualualei Reserve .....	5,908 " "	1.12 " "
Hawaii, Olaa Forest Park Reserve, Sec. A .....	2,460 " "	.46 " "
Total .....	8,940 feet or	1.69 miles



### New Fences Constructed:

Hawaii, Olaa Forest Park Reserve, Sec. C, 19 to 22 Miles, in cooperation with Y. Tanaka ..	4,645 feet or	.88 miles
Maui, Koolau Forest Reserve .....	1,428 " "	.27 "
Total .....	6,073 feet or	1.15 miles

Ranger Ellis was temporarily called off the work of completing the boundary fence on the Kula Forest Reserve, Maui, in order to do some special work on Hawaii, but he will return to Maui early in June to complete this fence. He has been furnished with a motorcycle so that he may more readily get about the country in making his fence inspections.

For the extension of the fence on the boundary of the Waiahole Forest Reserve, Oahu, where additional land has recently been acquired by exchange and where it is proposed to establish a chaulmoogra plantation, 250 redwood posts were sent over during the month preparatory to fence building.

### WAIMANALO FOREST RESERVE.

The setting of the boundary monuments of the proposed new forest reserve embracing the upper forest lands of Waimanalo, Kailua, and Polapu, was continued during the month and completed on June 2. On June 7 the survey of this boundary began. The attorney in fact for the owner of Kailua has given his cordial approval of including the upper Kailua lands within this new reserve.

One day was spent with the Land Commissioner in going over a part of the land of Keaau which he has requested be eliminated from the Makua-Keaau Forest Reserve and on which a report has already been furnished you.

### HILO FOREST RESERVE.

Work on the project of marking the boundaries of the Hilo Forest Reserve, Hawaii, and making certain additions was begun early in the month, with the Assistant Superintendent of Forestry in charge of the party of one government surveyor and two assistants. The work involves a careful survey of the line, with heavy country to traverse under adverse weather conditions. Up to the end of the month, approximately 10 miles of new boundary had been surveyed out and marked on the ground.

### HILO NURSERY.

During the month the Forest Nurseryman made an inspection of the Hilo Nursery, and besides finding it in good running order installed the new soil sterilizer. With this equipment there should be less damping off of seedlings and economy in labor, due to lack of weeds.

Respectfully submitted,

C. S. JUDD,  
Superintendent of Forestry.

## REPORT OF THE ASSISTANT SUPERINTENDENT OF FORESTRY, MAY, 1921.

Honolulu, Hawaii, May 31, 1921.

Mr. C. S. Judd, Superintendent of Forestry, Honolulu, T. H.:

Dear Sir:—I respectfully submit the following statement of my work during the month of May, 1921:

On May 3, accompanied by Forest Ranger Ellis and District Fire Warden Macalister, Manager on the Kukaiau Ranch, I made a general inspection of the nursery and orchard at Keanakolu and the mauka portion of the lands of Laupahoehoe, Maulua and Piha. The orchard, containing apple, peach, pear, prune, plum, and cherry trees, is very much in need of pruning, but because the season's fruit had already set on most of the trees I decided to postpone this work until the autumn. No evidence of scale or insect infestation of any kind was found in the orchard, and the accumulation of lichens on some of the trees is believed to be due chiefly to the choked condition of the crowns, which can be corrected by proper pruning.

Planting sites for the coniferous trees at Keanakolu were selected in Laupahoehoe, and Ranger Ellis was left at Keanakolu to take charge of the planting operations. We were fortunate in getting laborers from both Kukaiau and Parker Ranches to do this work. A total of 2,664 trees was planted, at the rate of 115 trees per man per day. Although the plants were much overgrown, it is hoped that the favorable weather which prevailed at the time of planting will make for a fair percentage of establishment. Many of the Benguet pine plants were over five feet in height and were headed back to two or three feet. Several hundred plants of *Pinus insularis* were withheld for distribution to the Parker Ranch, Shipman Ranch, and Kukaiau Ranch, and two boxes were sent to Forest Ranger MacKenzie for planting at the Volcano Observatory, Volcano House, and the vicinity of Olaa Ranger Station.

On May 4, I returned to Hilo to meet Assistant Territorial Surveyor Hockley and his assistant, who arrived from Honolulu on May 5, and on the 10th camp was established at the home of a homesteader in Kauaana. On May 13, Ranger Ellis returned from Keanakolu and worked with the survey party until the 27th, when he left for Honolulu. During the month I worked directly with the Surveyor, assisting in the work of triangulation to tie up our boundary with the established monuments, selecting suitable camp sites, and locating critical points on the line. By the end of the month the forest line had been surveyed as far as Honolii Gulch, much of the distance from Kaumana being through very rough country. Camps were occupied during the month in Kaumana, Amaulu, and Kaiwiki.

On May 8, I met Mr. Rock at the Volcano House and spent the day in an instructive exploration of the forest northeast of the hotel. On the 10th we went to Kukaiau Ranch and spent two days on the intermediate slopes of Mauna Kea, securing specimens and photographs of the vegetation.

I spent the last two days of the month in making the ascent of Mauna Loa, in company with several members of the Honolulu Trail and Mountain Club, the trip being completed on June 1. In the course of this trip eleven wild goats were killed within the limits of the Hawaii National Park, where they are still very abundant.

Respectfully submitted,

C. J. KRAEBEL,  
Assistant Superintendent of Forestry.

## REPORT OF THE FOREST NURSERYMAN, MAY, 1921.

Honolulu, Hawaii, May 31, 1921.

Superintendent of Forestry, Honolulu, T. H.:

Dear Sir:—I herewith submit the following report for the month of May:

## NURSERY.

*Distribution of Plants.*

Sold 50 in transplant boxes, 294 pot grown—total .....	344
Gratis 67 in transplant boxes, 327 pot grown—total .....	862
Total .....	1,206

*Collections.*

On account of plants sold .....	\$4.05
On account of plants sold at Hilo .....	3.85
Total .....	\$7.90

*Plantation Companies.*

Distribution of plants amounted to 200 pot grown.

## MAKIKI STATION.

The work done at this station consisted principally of transplanting seedlings into transplant boxes, tin cans, and pots.

## HONOLULU WATERSHED.

Trees planted during month amounted to:

Koa .....	493
Australian Red Cedar .....	553
Total .....	1,048

The koa trees were planted near the top of Makiki Main Valley on the Ewa side, and the Australian red cedar in the old eucalyptus forest on patches where formerly a stand of eucalyptus occupied the ground, but those trees got uprooted during recent storms.

## SUB-NURSERIES.

Hawaii—Sub-Nursery at Hilo, in charge of Bro. Matthias Newell.  
Maui and Molokai—At Haiku, Maui, in charge of James Lindsay.  
Kauai—At Kalaheo, in charge of Joe Rita, Jr.

Reports for the month of May on distribution of plants:

	In Transplant Boxes.	Pot Grown.	Total.
Hilo, Hawaii .....	566	1,321	1,887
Maui and Molokai .....	450	20	470
Kauai .....	...	47	47
Totals .....	1,016	1,388	2,404

## TRIP TO HILO.

The writer left Honolulu on May 11, and returned on May 17.

The trip was made for the purpose of installing a five horse power steam boiler and a four foot square wooden tank to be used as a sterilizer at the Hilo Nursery. A trial was made after the boiler and tank were erected and everything was found to work well. I examined the nursery and was pleased to find it in good condition, with a large number of trees coming on. The writer also called on a few of the Waiakea homesteaders who desired advice.

## ADVICE AND ASSISTANCE.

A visit was made to Schofield Barracks at the request of Colonel W. K. Jones of the 45th Infantry. Col. Jones has charge of the planting and laying out of the grounds around the barracks and officers' quarters.

The writer made the following number of calls and otherwise gave advice and assistance as follows:

Calls made .....	8
Advice given to people calling .....	5
Advice given by telephone .....	7

## JUDGING SCHOOL AND HOME GARDENS.

Two days were spent in assisting in the judging of the school and home gardens on this Island. The awarding of prizes for the winners will be made soon.

Respectfully submitted,

DAVID HAUGHS,  
Forest Nurseryman.

## DIVISION OF ENTOMOLOGY.

## REPORT OF THE ENTOMOLOGIST, MAY, 1921.

Honolulu, Hawaii, May 31, 1921.

Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.:

Gentlemen:—During the month of May, the insectary handled 19,500 pupae of the melon fly, from which were bred 3,204 females and 2,858 males, *Opius fletcheri*.

The distribution of parasites was as follows:

## MELON FLY PARASITES.

*Opius fletcheri*.

Oahu:	Females.	Males.
Moiliili .....	650	500
Oahu Prison .....	650	650
Nuuanu Avenue .....	450	450
Kauai: Kealia .....	200	200

## FRUIT FLY PARASITES.

*Galesus silvestri*.

Oahu: Kalihi Valley .....	Males and Females.
	1,700

*Dirhinus Giffardii*.

Oahu: Kalihi Valley .....	1,200
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*Diachasma tryoni.*

Oahu:	Females.	Males.
Kalihi Valley .....	270	200
Nuuanu Valley .....	150	150
Manoa Valley .....	50	50
Waipahu .....	50	50

*Diachasma fullawayi.*

Oahu:		
Kalihi Valley .....	270	200
Nuuanu Avenue .....	100	100
Waipahu .....	50	50

*Tetrastichus Giffardianus.*

Oahu:		
Kalihi Valley .....	800	....
Nuuanu Avenue .....	800	....
Waipahu .....	200	....
Nuuanu Avenue .....	300	....

*Opius humilis.*

Oahu:		
Kalihi Valley .....	120	100
Manoa Valley .....	50	50

On May 21, a consignment of parasites of the fern weevil (*Syagrius fulvitorsis*) was received from Mr. C. E. Pemberton, assistant entomologist on the staff of the H. S. P. A. Experiment Station, who is at present engaged in field work in Australia. These parasites were collected in the forest at Nimbin, N. S. W., in the locality where *Syagrius fulvitorsis* was first taken nearly half a century previous. The parasites came in excellent condition. A few have been retained for trial at rearing in cages; the remainder have been liberated under very auspicious circumstances in Tantalus. Mr. Pemberton's advices, accompanying the shipment, give confidence in the effectiveness of the parasite, and it is hoped that the individuals turned out will multiply and establish the species in these Islands.

Respectfully submitted,

D. T. FULLAWAY,  
Entomologist.

## DIVISION OF PLANT INSPECTION.

### REPORT OF THE CHIEF PLANT INSPECTOR, MAY, 1921.

Honolulu, Hawaii, May 31, 1921.

Board of Commissioners of Agriculture and Forestry, Honolulu, Hawaii:

Gentlemen:—I herewith submit my report of the work carried on by the Division of Plant Inspection for the month of May, 1921, as follows:

During the month 45 vessels arrived at the port of Honolulu, 24 of which carried vegetable matter, and 4 came by way of the Canal. The following disposal was made of the various shipments:

Passed as free from pests .....	833 lots	23,270 packages
Fumigated .....	4 "	4 "
Burned .....	42 "	42 "
Returned .....	7 "	7 "
Total Inspected .....	866 lots	23,323 packages

Of these shipments 23,034 packages arrived as freight, 180 as baggage, and 109 as mail.

#### RICE AND BEAN SHIPMENTS.

During the month 19,123 bags of rice and 3,426 bags of beans from Japan, and 2,318 bags of rice and 10 bags of beans from the United States arrived. All were passed as free from pests.

#### PESTS INTERCEPTED.

Approximately 2,987 pieces of baggage belonging to immigrants from foreign countries were examined, from which 22 lots of fruit and 14 lots of vegetables were seized and destroyed. A tabulated list of material intercepted, other than the above mentioned fruits and vegetables, follows:

##### Japan:

- May 9—19 pieces timber, cargo; fumigated. Borer indications.
- May 11—1 package citrus and tree seeds, mail; burned. Prohibited.
- May 18—2 packages plants and timbers, baggage; burned. Prohibited, and ants.
- May 18—1 package citrus trees, baggage; burned. Prohibited.
- May 18—1 package corn, baggage; burned. Prohibited.
- May 18—2 lots bamboo shoots, baggage; burned. Prohibited.
- May 25—2 packages citrus plants; baggage. Refused landing; ordered dumped at sea.

##### Philippines:

- May 6—1 package tree seeds, mail. Williams to H. S. P. A. CS<sub>2</sub> precautionary.
- May 18—3 packages betel nuts, baggage; burned. Infestation.
- May 18—1 package sugar cane seed, baggage; burned. Prohibited.

##### Portugal:

- May 2—2 packages taro root, mail; fumigated. Decay mites.

##### United States:

- May 17—1 case plants, cargo; fumigated. Mealy bugs.

#### BENEFICIAL INSECTS.

Following is a summary of the beneficial insects sent by various collectors now in the Orient to the H. S. P. A., received and inspected by me personally at the H. S. P. A. Experiment Station in the presence of Mr. Muir:

U. S. Logan, May 6—1 package fig wasps. Williams, Manila.

S. S. Makura, May 21—3 packages fern weevil parasites. Pemberton, Sydney.

#### HILO INSPECTION.

Brother M. Newell, Inspector at Hilo, reports the arrival of 8 vessels at Hilo, with 4 carrying vegetable matter, consisting of 147 lots and 2,803 parcels; 2,455 bags of rice, 456 bags of beans, and 10 bags of peas arrived from Japan. All consignments were found clean.

#### KAHULUI INSPECTION.

Mr. Louis Gillin, Inspector at Kahului, reports the arrival of 6 vessels, with 2 carrying vegetable matter, consisting of 17 lots and 908 parcels, all free from injurious infestation.

#### INTER-ISLAND INSPECTION.

Fifty-seven vessels plying between Honolulu and other Island ports were attended, and the following shipments passed:

Taro .....	164	bags
Vegetables.....	141	packages
Fruit .....	291	"
Plants .....	258	"
Seeds .....	8	"
Sugar Cane .....	197	"

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Total Passed ..... 1,059 packages

Thirty-four packages of plants, 2 packages of fruit and 3 lots of sugar cane were rejected through non-compliance with the regulations, undesirable soil and infestation.

#### LOCAL FUMIGATION.

During the month we fumigated the following for various firms: Twenty-nine bags bran, 253 bags oats, 273 bags flour, 39 bags middlings.

Respectfully submitted,

E. M. EHRHORN,  
Chief Plant Inspector.

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### DIVISION OF ANIMAL INDUSTRY.

#### REPORT OF THE TERRITORIAL VETERINARIAN, MAY, 1921.

Honolulu, Hawaii, May 31, 1921.

Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—I herewith submit my report on the routine work of the Division of Animal Industry for the month of May:

#### TUBERCULOSIS CONTROL.

The following dairy cattle have been tuberculin tested:

	Tested	Passed.	Condemned.
M. Robinson .....	2	2	0
Grove Farm .....	5	5	0
Haleakala Ranch .....	1	1	0
Hawaiian Commercial & Sugar Co.....	16	16	0
Antone Reyes .....	16	16	0
C. H. Bellina .....	45	45	0

A total of 85 head were tested all of which passed the test.

Besides the above, 6 head of cows condemned the previous month were autopsied and lesions of tuberculosis found in each case.

The new tags having arrived this month, a number of trips were made to tag cattle already tested and passed this year.

The record of the tuberculin test so far this year gives a total of 1,171 cattle tested with 1.2% of reactors.

#### RABIES VACCINATION.

During the past month six dogs were submitted to the anti-rabic treatment. All stood the treatment without any untoward symptoms developing.

## TRIP TO MAUI.

In response to a letter from Mr. W. A. Clarke, manager of Grove Ranch, and a wireless message from Mr. S. A. Baldwin, manager of Haleakala Ranch, I left for Maui on May 2, to investigate a supposed outbreak of blackleg among the calves on the Haleakala Ranch and influenza or equine distemper among the horses on Grove Ranch.

No determination could be arrived at re: the cause of death among the calves as there was no material for post-mortem examination and no new cases developed during my stay on the island.

The trouble among the horses was diagnosed as a combination of hemorrhagic septicemia and influenza. All cases found were segregated, vaccinated and otherwise treated. As the treated animals were making good recoveries and no new cases developing, I returned to Honolulu on May 12. No deaths occurred among the stock of the above two ranches while I was on the island.

While on Maui I treated the runner "Indian Spring," tested and passed Mr. H. A. Baldwin's dairy herd and gave instructions re: the treatment of two imported bulls on the Haleakala Ranch which were developing actinomycesis.

## EPIZOOTIC LYMPHANGITIS.

A case of epizootic lymphangitis among the plantation work stock on On Young's pineapple plantation at Kunia was reported to this office by Lieut. Sperry of Schofield Barracks.

In company with the Assistant Territorial Veterinarian and Lieut. Sperry, I investigated the case and verified the diagnosis. As the disease was just starting the animal was isolated and treatment outlined. Lieut. Sperry was instructed to report to this office the results of the treatment. If a cure cannot be established the animal will be destroyed.

## IMPORTATIONS OF LIVE STOCK.

During the past month 18 vessels were boarded and inspected by the Assistant Territorial Veterinarian, out of which number seven carried stock for this Territory. The following classes of live stock arrived:

Horses, 1; cattle, 26; dogs, 5; poultry, 57 crates; swine, 1.

Respectfully submitted,

LEONARD N. CASE,  
Territorial Veterinarian.

**REPORT OF THE ASSISTANT TERRITORIAL VETERINARIAN,  
MAY, 1921.**

Honolulu, Hawaii, May 31, 1921.

Dr. Leonard N. Case, Chief, Division of Animal Industry, Bureau of Agriculture and Forestry, Honolulu, T. H.

Dear Sir:—I beg to submit the following report for the month of May, 1921:



## TUBERCULOSIS CONTROL.

The following cattle were tuberculin tested this month:

	Tested.	Passed.	Condemned.
Mark Robinson .....	2	2	0
Grove Farm Plantation Co.....	5	5	0
Haleakala Ranch .....	1	1	0
Hawaiian Commercial & Sugar Co....	16	16	0
Antone Reyes.....	16	16	0
C. H. Bellina .....	45	45	0
Total . . . . .	85	85	0

The following condemned cattle were examined post-mortem at Pua-hale slaughter house, and found to be tuberculous:

J. F. Nevis .....	3
F. M. Roha .....	1
M. Kazue .....	1
Total . . . . .	5

## DISTEMPER TREATMENT.

E. W. Fahlgren—1 Chow dog.

## RABIES CONTROL.

G. D. Swisher.....	1 Bull dog.
D. C. McLean.....	1 French poodle.
A. F. Bily.....	1 Collie dog.
Capt. Eastwood.....	1 French bull dog.
W. Rapine.....	1 Spitz.
Total.....	5

## LIVE STOCK IMPORTATIONS.

Of the nineteen vessels inspected by me the following eight brought live stock to this port:

S. S. WEST NILUS, Seattle.

8 crates poultry .....	Chang Bros.
1 crate poultry .....	A. Hatfield

S. S. MANOA, San Francisco.

1 French poodle .....	D. C. McLean
1 Bull dog .....	G. D. Swisher
4 crates live turtles .....	Hong On Yonk Kee
33 crates poultry .....	Various

S. S. MANULANI, San Francisco.

1 Hereford bull .....	W. H. Shipman
5 Devon bulls .....	Grove Farm Plantation Co.
3 Hereford bulls .....	Princeville Plantation Co.
1 Hereford bull .....	Haleakala Ranch
16 Holstein heifers, 1 Duroc boar.....	Hawaiian Com. & Sugar Co.

## S. S. GOLDEN STATE, Orient.

1 Chow dog ..... E. W. Fahlgren

U. S. S. RAINBOW, Pearl Harbor.

1 Collie ..... A. F. Bily

S. S. HYADES, San Francisco.

1 French bull dog ..... Capt. Eastwood

15 crates poultry ..... Various

S. S. WOLVERINE STATE, Singapore .

1 horse ..... Mrs. Fred Waterhouse

S. S. MATSONIA, San Francisco.

1 Spitz dog ..... Mrs. W. Rapine

Respectfully submitted,

L. E. CASE,  
Assistant Territorial Veterinarian.

---

BY AUTHORITY.

PROCLAMATION OF WITHDRAWAL OF CERTAIN LANDS FROM  
THE HONOLULU WATERSHED FOREST RESERVE, DISTRICT  
OF HONOLULU, CITY AND COUNTY OF HONOLULU, ISLAND  
OF OAHU, TERRITORY OF HAWAII.

Under and by virtue of the authority vested in me by the provisions of Chapter 37 of the Revised Laws of Hawaii of 1915, and of every other power in me hereunto enabling, I, C. J. McCARTHY, Governor of Hawaii, with the approval of a majority of the Board of Commissioners of Agriculture and Forestry, having held the hearing of which notice has been duly given all as in said laws provided, do hereby withdraw and eliminate from the Honolulu Watershed Forest Reserve in the District of Honolulu, City and County of Honolulu, Island of Oahu, Territory of Hawaii, created and set apart by Proclamation of the Acting Governor of Hawaii, on October 13, 1913, those two certain pieces of government land in Makiki, containing 4.53 acres and 39,665 square feet, more or less, respectively, in the District of Honolulu, City and County of Honolulu, Island of Oahu, Territory of Hawaii, more particularly described by and on maps made by the Government Survey Department of the Territory of Hawaii, which said maps are now on file in the said Survey Department marked Government Survey Reg. Map No. 2338 and "Withdrawal, Portion of the Government Land on Makiki Heights," and "A. V. Gear Application to Purchase, Government Remnant Adjoining Lot 814, Makiki Round Top Lots," respectively, and descriptions accompanying the same in two parts numbered C. S. F. 3582 and 3599, respectively, which said descriptions, now on file in said Survey Department, are as follows:

WITHDRAWAL.

Portion of the Government Land on Makiki Heights, within HONOLULU WATERSHED FOREST RESERVE, Honolulu, Kona, Oahu, C. S. F. 3582.

Beginning at a pipe at the end of Course 76 of land described in HONOLULU WATERSHED FOREST RESERVE, and the East corner of this piece, being also the Northeast corner of Lot 648, Makiki Heights Lots, the coordinates of said point of beginning referred to Government Survey Trig. Station "Makiki" being 1476.1 feet North and 464.3 feet East, as shown on Government Survey Registered Map No. 2338, and running by true azimuths:

1. 90° 00' 164.6 feet along Lot 648;
2. Thence along same on a curve to the right with a radius of 40.0 feet, the direct azimuth and distance being: 17° 30' 69.2 feet;
3. 92° 44' 229.3 feet along Lots 647 and 646;
4. 87° 32' 296.9 feet along Lots 646, 645, and 644;
5. Thence along Lot 644 on a curve to the right with a radius of 68.7 feet, the direct azimuth and distance being: 117° 45' 69.1 feet;
6. 147° 59' 104.8 feet along Lot 644;
7. Thence across Makiki Drive to the North corner of Lot 643, the direct azimuth and distance being: 115° 57' 156.4 feet, said point being on the boundary of Makiki and Kalawahine;
8. 225° 12' 50.0 feet across Tantalus Drive;
9. 100° 17' 103.6 feet along the North side of Tantalus Drive to a stake;
10. 267° 32' 811.7 feet along proposed new line of forest reserve to an iron pin;
11. 294° 30' 110.0 feet along same to an iron pin;
12. 323° 14' 205.1 feet along same to the point of beginning.

Area, 4.53/100 acres.

A. V. Gear Application to Purchase Government Remnant adjoining Lot 814, Makiki-Round Top Lots, Honolulu, Oahu, within HONOLULU WATERSHED FOREST RESERVE. C. S. F. 3599.

Beginning at the Southwest corner of this lot and the Northwest corner of Lot 814, Makiki-Round Top Lots (Grant 6812 to H. V. Gear), and on the East side of Round Top Drive, coordinates of said point of beginning referred to Government Survey Trig. Station "Makiki" being 287.49 feet South and 669.26 feet East, as shown on Government Survey Registered Map No. 2338, and running by true azimuths:

1. 191° 45' 365.0 feet along Round Top Drive;
2. 212° 30' 141.8 feet along same;
3. Thence on a curve to the right with radius of 16.83 feet, the direct azimuth and distance being 294° 07' 30" 33.3 feet;
4. 15° 45' 230.0 feet along Round Top Drive;
5. Thence along same on a curve to the left with a radius of 262.77 feet, the direct azimuth and distance being: 346° 22' 30" 257.8 feet;
6. 92° 45' 179.4 feet along Lot 814, Makiki-Round Top Lots, to the point of beginning.

Area, 39,665 square feet.

In Witness Whereof, I have hereunto set my hand and caused the Great Seal of the Territory of Hawaii to be affixed.  
(Seal)

Done at the Capitol in Honolulu this 28th day of June, A. D. 1921.

C. J. McCARTHY,  
Governor of Hawaii.

By the Governor:  
CURTIS P. IAUKEA,  
Secretary of Hawaii.









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(1921)

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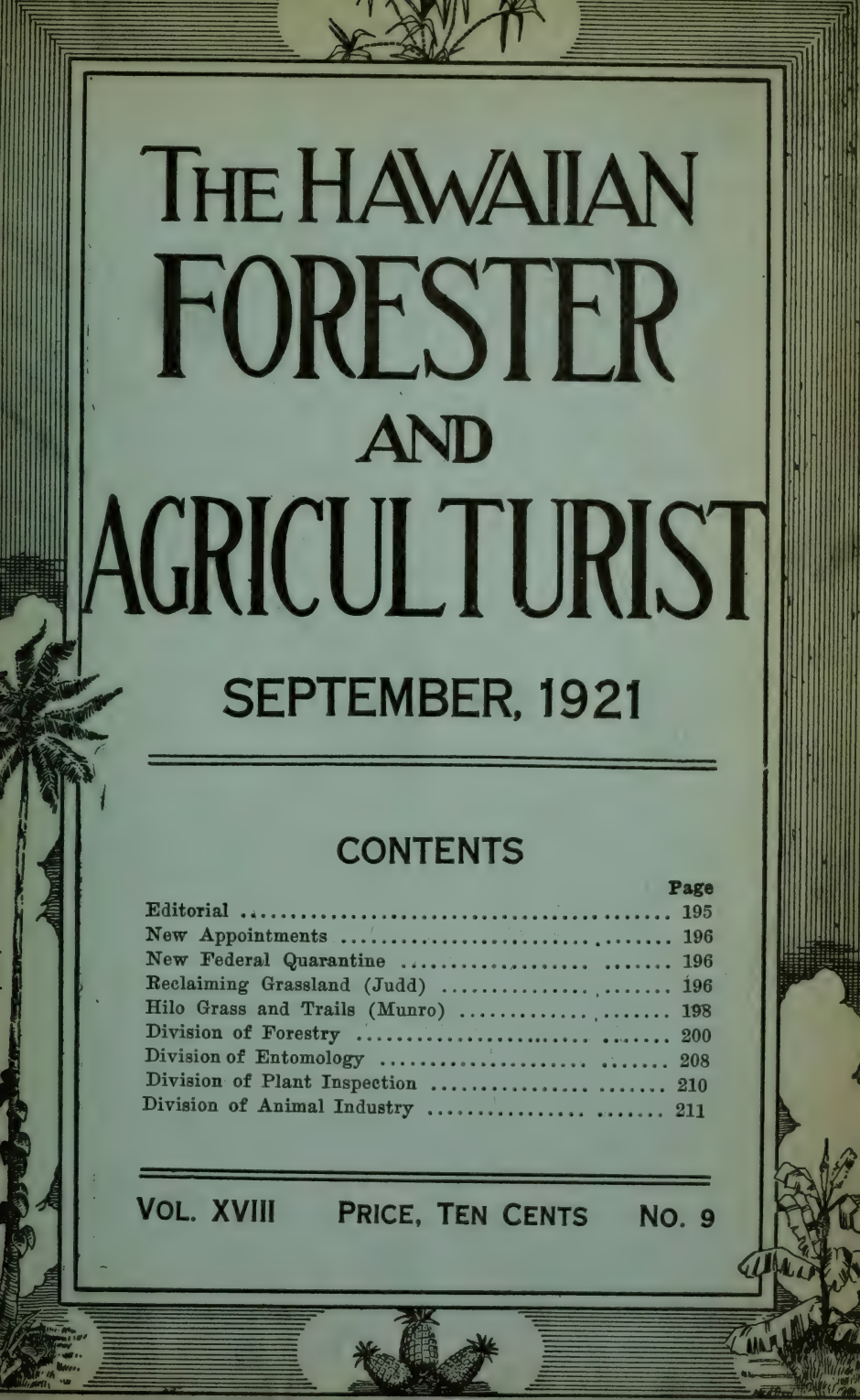
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# THE HAWAIIAN FORESTER AND AGRICULTURIST

SEPTEMBER, 1921

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# THE HAWAIIAN FORESTER AND AGRICULTURIST

VOL. XVIII.

HONOLULU, SEPTEMBER, 1921.

No. 9

An interesting discussion of the Hilo grass question is printed in this issue.

New insect parasites recently introduced and distributed are listed in the current report of the Entomologist.

The Superintendent of Forestry will soon recommend an addition of about 15,460 acres to the Upper Waiakea Forest Reserve on the Island of Hawaii.

A proposed new forest reserve in the District of Hamakua, Hawaii, is described in the current report of the Superintendent of Forestry.

The Kilauea Section of the Hawaii National Park was dedicated on July 9, 1921, by a simple but appropriate ceremony on the brink of Halemaumau.

The first progress report on the experiment initiated six months ago in Nuuanu Valley to determine whether Hilo grass may be shaded out by *haole koa* is printed in this number.

President A. L. C. Atkinson left Honolulu on September 21 for a short visit on the Coast, and has designated Commissioner A. H. Rice to act as President during his absence from the Territory.

Progress is being made in the resurvey of the Hilo Forest Reserve on the Island of Hawaii and additional areas of government forest land, amounting to many hundred acres, are being included within the enlarged boundaries.

One of the few remaining stands of large koa trees in a healthy condition to be found on government land is situated in the Honuaula Forest Reserve at 6,000 feet elevation on the slopes of Hualalai, Hawaii.

Action has finally been taken by the federal authorities on a request of this Board, made some years ago, and a plant quarantine has been established whereby Hawaii will be given greater protection against new pests occurring on the mainland but not as yet found here.

## NEW APPOINTMENTS.

---

At a meeting of the Board held on September 20, 1921, Mr. Lawrence L. Peralto of Kaumana, Hawaii, was appointed Forest Ranger for the Hilo Forest Reserve, effective on October 1, 1921.

At the same meeting Mr. W. K. Shultze of Hana, Maui, was commissioned as Fire Warden for the District of Hana, to succeed Mr. John Chalmers, resigned.

## NEW FEDERAL QUARANTINE.

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Copies of Notice of Quarantine No. 51 with regulations approved by the Secretary of Agriculture on July 22, 1921, and promulgated by the Federal Horticultural Board of the U. S. Department of Agriculture in the interests of the agricultural and horticultural industries of the Territory of Hawaii have just been received from Washington and go into effect on October 1, 1921. The object of this quarantine is to prevent certain insect enemies of the mainland, new to and not heretofore widely prevalent or distributed within and throughout the Territory of Hawaii, from gaining an entrance here, and under it the movement of sugar cane, corn (other than shelled corn), cotton and alfalfa plants or parts thereof, and the fruits of the avocado and papaya in the natural or raw state from the United States to the Territory of Hawaii by passengers and crews of coastwise ships or vessels, either as baggage or otherwise, or as ships' stores is prohibited.

Passengers coming to Hawaii from the mainland will be required to sign a baggage declaration on the official form of the U. S. Department of Agriculture, as is required of passengers from Hawaii going to San Francisco.

The provisions of this new quarantine will be carried out by the inspectors of the Division of Plant Inspection of the Board of Agriculture and Forestry, who are also commissioned as inspectors of the U. S. Department of Agriculture.

## RECLAIMING GRASSLAND.

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### First Progress Report.

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By C. S. JUDD, *Superintendent of Forestry.*

An experiment was initiated on March 17, 1921, in Nuuanu Valley on the Honolulu Watershed Forest Reserve, to determine whether areas covered with Hilo grass could be reclaimed by shading out the grass through the establishment of a stand of haole koa (*Leucaena glauca*).\*

---

\* See "The Hawaiian Forester and Agriculturist," March, 1921, pp. 57-60.

For this experiment nine plots, each one-hundredth of an acre in size, were used and treated as follows:

On Plots 1 to 3 the grass was left undisturbed.

On Plots 4 to 6 the grass was burned off.

On Plots 7 to 9 the grass was burned and the ground dug up.

Each plot in each set was then sown broadcast with seed of the above tree at the rate, respectively, of 10, 20, and 30 lbs. of seed per acre. In actuality this amounted for Plots 1, 4, and 7 to 1.6 ounces or 838 seeds which could be expected to grow; for Plots 2, 5, and 8 to 3.2 ounces or 1677 seeds; and for Plots 3, 6, and 9 to 4.8 ounces or 2515 viable seeds.

On September 16, 1921, an examination of the plots was made to determine what had happened by the end of the first half year period. The six months intervening had been comparatively dry and on the plots from which the grass had been removed the ground was dry and had cracked open in places. The ground on the three untreated plots was wet on account of the heavy mat of Hilo grass which retained the moisture.

A count of the haole koa seedlings on the nine plots gave the following results:

Plot No.	Number of Seedlings Found	Number of Good Seeds Sown	Germination Per Cent	Treatment of Plot
1 .....	None	838	None	Natural grass
2 .....	None	1677	None	Natural grass
3 .....	None	2515	None	Natural grass
4 .....	84	838	10	Grass burned
5 .....	172	1677	10	Grass burned
6 .....	292	2515	12	Grass burned
7 .....	110	838	13	Grass burned and ground plowed
8 .....	232	1677	14	Grass burned and ground plowed
9 .....	240	2515	10	Grass burned and ground plowed

The number of seeds that germinated did not amount to what had been expected, but it is possible that further germination of seed, still lying dormant in the ground, will take place, and that a larger number of seedlings will show up in the next count.

The results of the examination show that seeds sown in the tall grass have no chance for germination, and that seed, sown on the plots on which the grass had merely been burned, germinated almost as well as on the plots where the grass had been burned and the ground dug up.

The largest seedling on the former set of plots was 5 inches high with a tap root 10 inches long. On the second set of plots the tallest was 14 inches high with a tap root 10 inches long.

## HILO GRASS AND TRAILS.

---

Keomuku, Lanai, June 28, 1921.

To the Editor

Hawaiian Forester and Agriculturist,  
Honolulu, T. H.

Sir:—I have read with interest Superintendent of Forestry C. S. Judd's "Hawaiian Forests and Trails" in your April number, and I will be grateful if you will give me a little space for a plea for leaving open to lovers of native plants and forest scenery the trails in the Government Forests, as I am sure that Mr. Judd is quite mistaken in some of his deductions.

Seventeen years of close study of the effect of protection on the Hawaiian forests convinces me that no possible harm can come to the wet forest from the introduction of any kind of grass along forest trails, provided animals, including pigs, are rigorously excluded from ranging in the forest. A fringe of grass may grow along the trails, but has no chance whatever of spreading into the forest, and even where in a forest, before being brought under protection, grasses have taken hold on open spaces, in a remarkably short time the ferns will overtop and choke the grasses, and the shrubs and trees will follow to take up the ground, the length of time depending on the size of the spaces and the degree to which the forest has been denuded; and as the encroachment of the ferns comes from the outside, large spaces will naturally be a longer time in covering, but on small spaces the introduced grasses quickly disappear.

Specimen collectors will do some little injury to the forests, but if true nature lovers it will be slight and nature will quickly mend it. Picnic parties can do a great deal of damage thoughtlessly by crushing the ferns and breaking the shrubs, but the hiker who keeps to the trails will not hurt the forest cover in any way, and a certain number of trails being necessary in most forests, it would be a pity to exclude the well-behaved citizen from the unique enjoyment of tramping these trails.

The triumph of the native vegetation over the introduced grasses can only be seen where stock are rigorously excluded, as the grazing of stock has a tendency to injure the forest growth and strengthen the grasses. Therefore, I feel sure that where the forester finds grasses encroaching on the forest, a close examination will show him that stock periodically invade the locality.

Keep all kinds of stock and fire out of the wet forests, and regulate the human visitant, and the forests thus treated will suffer no harm from grasses accidentally introduced.

Yours truly,

G. C. MUNRO.



NOTE: — It is with pleasure that the foregoing letter is printed, for on account of his long residence in these islands and close study of forest conditions Mr. Munro's opinions and the results of his observations are worthy of careful consideration.

Discussion on this important subject is also welcomed in the hope that practical suggestions will be offered for the solution of the grave problem of giving our important watershed forests greater protection.

On some points in his letter we must perforce differ from Mr. Munro, for he seems to have in mind only the healthy wet Hawaiian forest in the pink of growing condition. We accept, without reservation, his statement that the grazing of stock has a tendency to injure the forest growth and strengthen the grasses. Examples of this are unfortunately too abundant and may be seen in almost all of our foothill country. Where, however, the native wet forest in the back regions has begun to decline, not because of injury resulting from stock grazing, but from sundry other causes, such as poor soil conditions, improper drainage, or exposure to unusual winds, it is firmly believed that the recuperative powers of the forest are often not sufficient to overcome the extra burden of crowding out Hilo grass introduced in seed form by the feet of trampers and inadvertently scattered in the exposed soil along a cut trail.

In such a decadent forest the trees have begun to die out and are too far apart to form a complete crown canopy. As a result, the ferns are not given the protection they require for the healthiest growth and consequently they lack the strength and vigor necessary to crowd out an introduced grass. The trail serves as a germinating seed bed for the Hilo grass, with the supply of seed replenished by each new party that goes over the trail, and from this seed bed the grass spreads where it will through the partly opened forest with very little hindrance. The decadent forest growth has not the required vigor to stop this invasion and the triumph of the native vegetation is turned into ignominious defeat.

An excellent example of this may be seen near the summit of the Koolau Range on Oahu, on the steep upper slopes of Palolo and Manoa Valleys, where no livestock ever trespasses, but where a cut trail is serving as the focus for the spread of Hilo grass into the adjacent declining native forest, and this trail was in the mind of the author of the article mentioned in the first paragraph of Mr. Munro's letter.

The wilful breaking of branches and shrubs and the thoughtless crushing of ferns by picnic parties, while deplorable, results in damage which is insignificant when compared with the natural damage caused by the spread through the forest of Hilo grass which has been brought in unintentionally in the form of seed on the feet of trampers.

If we are to retain our forest cover in its most effective condi-

tion, so that it will conserve water to the highest degree, the only way to regulate this unconscious damage resulting from the human visitant is by complete exclusion. C. S. J.

---

## DIVISION OF FORESTRY.

---

### REPORT OF THE SUPERINTENDENT OF FORESTRY, JULY, 1921.

Honolulu, Hawaii, August 9, 1921.

Board of Commissioners of Agriculture and Forestry,  
Honolulu, T. H.

Gentlemen:

I respectfully submit the following report of the Division of Forestry for the month of July, 1921:

#### FOREST PLANTING.

On account of the dry conditions in the Waianae District, Oahu, no trees were planted out in the Lualualei Forest Reserve during the month, but the time of the men was devoted to weeding and digging new holes. The trees planted previously in this region are doing well and the several species of eucalyptus and the silk oak trees especially are growing rapidly.

In Makiki Valley, in the Honolulu Watershed Forest Reserve, 245 koa trees were planted, and in the Waiahole Reserve on Oahu five men were engaged in weeding the kauri pine and araucaria plantation and in digging holes preliminary to further planting on that reserve.

Through the courtesy of Mr. Clarence Macfarlane, 100 kou and 12 coconut trees were planted on Kapapa Island, on the outer reef of Kaneohe Bay, to determine whether they would survive the exposed conditions on that island, which is under the jurisdiction of this Division.

#### NURSERY IMPROVEMENTS.

A new steam engine arrived for the Makiki Nursery at the end of the month and will be installed as soon as the work of sawing 500 fence spreaders from silk oak logs is completed. The old engine will then be shipped up to Hilo, where it will be installed to run a small sawmill by the Forest Nurseryman, who will at the same time supervise the construction of a small seed germination house, which is much needed at the Hilo nursery.

During the month the Forest Nurseryman, in addition to visiting tree planters on West Maui and giving them advice, inspected the Haiku nursery and found it to be in good shape, with quite a supply of trees on hand. The new soil sterilizer there is in effective running order.

A personal inspection of the Hilo nursery resulted in finding it in excellent condition. In order to be in a position to supply choice fruit trees to homesteaders and others from this nursery, I have asked the Forest Nurseryman to bring up with him to Hilo one dozen choice alligator pear and one dozen choice mango trees, properly quarantined in sterilized soil. These are to be planted at the Hilo nursery at once, so as to supply grafting material.

The manager of the Kukaiau Ranch, Hawaii, who maintains a fence

rider at an elevation of 5,340 feet to keep in stock-proof condition the fences near the northwest corner of the Hilo Forest Reserve, has offered the services of this man for the experimental propagation and planting of trees which may be found to grow well on government lands in this region. A shipment of shooks for 50 boxes will soon be sent up to him, together with seed of a variety of temperate zone trees which it is thought might be successfully grown at this elevation.

### FOREST FENCING.

From reports which have reached me from the rangers, a total of 2.36 miles of fences on forest boundaries have been repaired during the month by replacing posts, tightening wire, and clearing brush and ferns away from the fences. In this manner 400 feet of fence was put in stock-proof shape at Makua, Oahu, and 8,080 feet in Sec. C. and 4,000 feet in Sec. A. of the Olaa Forest Park Reserve, Hawaii.

On July 21 I inspected a part of the boundary of the Olaa Forest Reserve, Hawaii, near 24 Miles, on the Volcano Road, and found that the lessee of a piece of adjacent government land, S. Kanamori, had built in a substantial manner 500 feet of a hog-proof fence which is required, by the general lease which he holds from the Land Office, to be built on the forest boundary. He plans to have the whole fence completed in about two months.

Reports received from Ranger Ellis indicated that the fences required, by general leases and a land license, to be built and maintained in certain parts of Maui on forest reserve boundaries, were in such bad shape that as a result cattle were gaining access to the forest reserves. This was particularly true in the region near Polipoli Springs in the Kula Reserve and at Ukumehame and Kahakuloa in the West Maui Reserve. The situations were immediately called to the attention of the Land Commissioner, whose province it is to enforce the fencing requirements in general leases, with the suggestion that he have his Sub-Agent investigate for specific violations and take steps to require the fences to be repaired at once.

### COOPERATION WITH U. S. G. S.

On July 2, I held a conference with Mr. A. O. Burkland, Topographic Engineer in charge of the United States Geological Survey topographic work in the Territory, and his assistant, Mr. M. J. Gleissner, with whom I revised the legend used in topographic mapping to show forest and other classes of cover, and made plans for a visit to the Mauna Kea Forest Reserve with topographic mapping and other investigations in view.

### FOREST FIRE.

On July 12, a fire started on the military reservation of Schofield Barracks from unknown causes, but was put under control the same day by the army after it had spread over Maili Ridge to the Wailua side on the east slope of Kaala. On the following day the wind started the fire again, but soldiers, sent out at the request of Fire Warden A. A. Wilson, extinguished it that day. The fire of the two days burned over approximately 100 acres, of which 90 per cent was grassland and the balance forest.

### HAWAII TRIP.

On July 7, I left Honolulu for Hawaii and made my headquarters at the Kilauea Ranger Station at 29 Miles, in Olaa, at which place I could most economically live and most conveniently start out for the inspection of the many forest reserves which had awaited my attention on the Big Island. Investigation of matters inquired into during the



rest of the month and not already touched on in this report resulted as follows. I had planned if possible to visit and see as much as possible of each reserve on this island. By dividing up the work with my assistant it is hoped to complete this program during August.

### HILO FOREST RESERVE.

The work of surveying and marking the revised boundary of the Hilo Forest Reserve progressed from Waawaa Stream in Hakalaunui to Pohakupuka Stream in Mauluanui, a distance of approximately six miles. Inclement weather has somewhat interfered with the transit work. With my assistant I checked up the line as run across the government land of Piionua, and discovered that there are additional areas, amounting to approximately 387 acres, which are covered with dense forest on the ridges and along the branches of the Wailuku River, which should properly be in the forest reserve. The surveyor will revise the line so as to include such areas. The surveying of the whole line should be completed in another month.

On July 26 and 27, we made an inspection of the government lands near the northwest corner of the Hilo Forest Reserve. Here the forest boundary fences are all in good condition and tame cattle are doing no damage to the forest on government lands. In the upper part of Piha the forest is recovering splendidly as a result of the protection given by the fencing which I was instrumental in constructing, in cooperation with the Kukaiau Ranch, five years ago. The young koa trees are in a very flourishing condition and beneath and around them there is a good stand of ferns. In marked contrast is the adjacent private land of Maulua, leased by the Kukaiau Ranch and used as a pasture. Here the forest is now more open as a result of grazing, the undergrowth of ferns and shrubs is largely depleted, and the killing of practically all of the young koa trees by the cattle chewing the bark will mean that if such conditions continue there will be no young forest to take the place of the veteran trees which will eventually die.

From the forester's viewpoint, it is very desirable that the title to Maulua, which is within the boundaries of the Hilo Forest Reserve, be acquired by the Territory, so that it may be handled under the same protection scheme along with adjacent government lands. The same applies to the privately owned land of Waipunalei, which is used by the Parker Ranch as a pasture.

### PROPOSED MANOWAIALEE FOREST RESERVE.

On July 27, I rode out of the Hilo Forest Reserve at an elevation of 3,300 feet, finding the last land at the north end of the reserve, Humuula, belonging to the government, in excellent condition. Going westward the next land crossed was Manowaialee, government land under lease to the Kukaiau Ranch until September 9, 1928; then Kaiwiki, Bishop Estate land leased to the same ranch, and then Niupea, government land under a lease similar to Manowaialee. The next land encountered was the private land of Kaala, but this is open pasture land on account of fire and grazing, and on which the forest has almost disappeared.

At the lower ends of Manowaialee and Kaiwiki small sections of forest are protected by fencing clauses in the leases, but these two lands and the government land of Niupea sustain a much larger area of good jungle forest up to about 4,000 feet in elevation, which should not be allowed to be destroyed by grazing. This is in the region of Hamakua, where the rainfall lessens and every bit of forest is needed to conserve the rainfall in a section of the country where water is often at a premium. As yet the forest on about 1,630 acres is in good condition and not damaged by grazing except toward the Kaala end. It will be years before the land can be converted from forest to a decent pasture. In



my opinion, the land is much more valuable for forest, and with this in view I have requested the surveyor to mark the forest area on the ground and furnish me with a description of the area, to be used as the basis for a new reserve, to be called the Manowaialee Forest Reserve.

#### • HONUAAULA FOREST RESERVE.

On July 19, I visited the Honuaula Forest Reserve on the southwest slope of Hualalai, between the elevations of 5,400 and 6,360 feet, in company with Mr. John Lind, manager of the John Maguire Estate Ranch. This I found to be completely fenced in a stock-proof manner, the fences on the upper sides being also sheep-proof, and with no animals in the reserve. The forest consists of splendid large koa trees, with a stand of the smaller naio and mamani, and a heavy undergrowth of akala bushes and luxuriant ferns. This is probably the best stand of large koa trees left in Kona and the only stand which has not been deteriorated by cattle grazing.

This reserve embraces 665 acres, all of which is government land. In my opinion this forest area is valuable and has some beneficial effect in helping to condense the atmospheric moisture which drifts in every afternoon in the form of cloud banks. On account of the splendid stand of koa trees of huge proportions, this forest, after all other koa forests in Kona have been destroyed by grazing, will also be of value for its botanical and historical interest, just as the remaining redwood forests in California are now esteemed and protected.

Surrounding this reserve on three sides there are 5,197 acres of the government land of Honuaula, which have been parcelled out in three grazing leases issued by the Land Office. On these and on the fourth side, which includes the private lands of Puua 1st and Holualoa, the forest has been severely injured by grazing and before long will entirely disappear.

#### WAIAHA SPRING RESERVE.

On the same day I visited the Waiaha Spring Forest Reserve on the same slope, between the elevations of 2,380 and 3,000 feet. This is also fenced, and is a swampy country, supporting a stand of ohia trees festooned with ieie vines, with a heavy undergrowth of amaumau ferns ten feet high. No running stream was found on the area. Six head of cattle were seen in this reserve, and the owner, Mr. Manuel Gomes, was notified the following day to remove them and report the accomplishment. This he did on July 25.

#### WATER DEVELOPMENT.

Near the Waiaha Spring Reserve, but higher up the slope, at an elevation of 3,200 feet, and on the private land of Holualoa, the John Maguire Estate has erected a battery of three redwood tanks with a total capacity of 200,000 gallons of water. From these tanks water is piped 10 miles to Huehue and 17 miles to Kiholo paddock of Puu Waa-waa Ranch. The tanks are fed from a small stream nearby which emanates from a heavy forest of ohia, ieie and ferns. On the day of observation the tanks were full and running over, and Mr. Lind informed me that during the year 1920 the stream ran constantly with the exception of 16 days. Cattle at present have access to the forest. To assure a continuous flow of water in this stream, from 150 to 200 acres of the private forest land surrounding it should be fenced and absolutely protected from stock. This was recommended to the manager on the ground, who heartily agreed with the idea.

## UPPER WAIAKEA FOREST RESERVE.

On July 22 and 23, I spent two days with Mr. George Collins of the Bishop Estate and a guide in the woods back of the Upper Olaa and Upper Waiakea Forest Reserves, where they lie adjacent to the Bishop Estate land of Keauhou. On the latter, a private forest reserve of about 5,000 acres is supposed by lease requirements to be protected by a suitable fence. This we found out of repair, and tame cattle have wandered far into the jungle, even as far as the hill called Kulani. Here also we heard wild cattle and saw much evidence of wild pigs. Kulani Hill is the common boundary point of Olaa, Keauhou and Waiakea. The mauka boundary of the Upper Waiakea Reserve runs from Kulani straight across to a point in the 1855 lava flow on the Piihonua boundary. Above this line the balance of the land of Waiakea supports a forest, meagre on the recent flows, but heavy on the old lands, which should well be included in the forest reserve. A portion of this was viewed from both Kulani and Kipu Hills. The necessary fencing of boundary can probably be undertaken in cooperation with the Bishop Estate.

This proposed addition to the Upper Waiakea Forest Reserve at this upper end of the land of Waiakea will amount to approximately 15,460 acres, and as soon as a description can be obtained from the Survey Department I shall recommend the enlargement of this reserve.

My attention has also been called by Mr. S. W. Tay, Sanitary Engineer of the Board of Health, to the fact that cattle are roaming about the land at the Waiakea flume heads. The makai boundary of the Upper Olaa Forest Reserve in this region follows approximately the Olaa flume. It is my plan early in August to investigate this region to ascertain what additional government forest lands not needed for homesteading may be included in this reserve at this makai end.

## KOHALA MOUNTAIN FOREST RESERVE.

During the week beginning July 18, I had my assistant, Mr. Kraebel, visit the Kohala region, so as to become familiar with and investigate conditions in the Kohala Mountain and Hamakua Pali Forest Reserves. This he did, in company with Ranger H. K. Stender, as will be seen by his routine report for July.

## RESULTS OF EXPERIMENTAL PLANTING.

During our visit to the land of Laupahoehoe in the Hilo Forest Reserve, on July 26, Mr. Kraebel and I inspected the plantings of Benguet pine and other conifers which Ranger Ellis set out in May. Dry weather conditions since the planting and the large size of planting stock used are probably responsible for the reduction to about 5 per cent of living trees out of the total number planted.

An inspection of the site of the old ranger station in the Upper Olaa Forest Reserve, two miles back of the Volcano House, on July 16, resulted in finding three redwood trees which I had planted there two years ago. These are now eight inches high and show promise of success.

## TIMBER CUTTING.

During his work in connection with running the Hilo Reserve boundary, Mr. Kraebel discovered the apparently unauthorized cutting of green ohia timber on unleased government land mauka of the Kamaee homesteads and on untaken lots 18 and 19 of the Opea-Peleau homesteads. The facts have been reported to the Sub-Land Agent in Hilo for investigation.

## COOPERATION WITH THE BISHOP MUSEUM.

Half a day was spent with Professor Stevens, now enjoying a fellowship from the Bishop Museum and Yale University for studying the fungi of these islands, on a leaf fungi collecting trip on the Upper Olaa Forest Reserve. I also collected for him a quantity of specimens from the region on the southwest slope of Hualalai, between the elevations of 2,500 and 7,000 feet. Professor Stevens had previously accompanied me in June to Kauai, where, in the region of Halemanu particularly, he found an exceedingly rich collecting field.

## WORK FOR AUGUST.

It is planned to complete as much as possible of the investigative work on Hawaii during August. There remain the two reserves in Puna, the south end of the Kau Reserve, the Mauna Kea Reserve, further checking along the readjusted line of the Hilo Reserve, parts of the Olaa Reserve and the addition along the makai line of the Upper Waia-kea Reserve. Since some of this means foot work in jungle country, which is necessarily slow, it is more than likely that the larger part of August must be spent in the completion of the necessary inspections.

Respectfully submitted,

C. S. JUDD,  
Superintendent of Forestry

**REPORT OF THE ASSISTANT SUPERINTENDENT OF FORESTRY,  
JULY, 1921.**

Honolulu, Hawaii, August 8, 1921.

Superintendent of Forestry,  
Honolulu, T. H.

Dear Sir:

I respectfully submit the following report of my activities during July, 1921:

The makai boundary survey of the Hilo Forest Reserve has been extended by Mr. Hoekley's crew during the month from Waawaa Stream to Pohakupuka Stream, a distance of approximately 5.8 miles. Pipes have been placed at points indicated on the progress map on file in the office. On July 12, Mr. L. W. Bryan, a forester assigned to the Hilo Forest Reserve by the H. S. P. A. Experiment Station, presented himself, and from that time forth worked with the survey party in order to acquaint himself thoroughly with the Hilo Forest. The nature of the country traversed by the survey in July, and especially the arrival of Mr. Bryan, permitted me to be away from the survey party during most of the month, and to give my attention to forest matters in other parts of the Island of Hawaii.

In company with the Superintendent of Forestry, who reached Hilo on July 8, I attended the dedication of the Kilauea Section of the Hawaii National Park. This simple ceremony occurred, appropriately enough, at the brink of the fire-pit of Kilauea on July 9.

During the following week I accompanied the Superintendent on an inspection of the Hilo Forest Reserve boundaries in Punahoa and Piihonua, and also on a visit to Wood Valley in the Kau Reserve. In Piihonua it was decided to include within the reserve two small areas of unencumbered government land which are now covered by dense forest and are apparently unsuited to other purposes.

A trip was also made into the Kau Desert to examine a small, isolated grove of koa trees reported by Professor Jaggard. The grove,



which looms like an oasis some two and one-half miles south of Halemauau, consists of seven distinct koa trees of considerable age and two ohia lehuas. The occurrence of heavy-seeded koa trees at so great a distance from all sources of seed is very unusual and is probably accounted for by the existence at the spot of a kipuka of soil and vegetation which was not buried when the desert material was originally deposited. The mystery of the grove lies in the fact that, from such hasty examination as could be made in a brief visit, the actual vicinity of the grove does not seem to differ geologically from the surrounding desert floor. More careful examination will very likely discover the correct explanation of the grove's existence.

With the Superintendent and Dr. Stevens, a visiting plant pathologist from the University of Illinois, an inspection and collecting trip was made into the Upper Olaa Forest Reserve. Although Dr. Stevens was chiefly interested in inconspicuous leaf-rusts, it was gratifying that he found the trees of the volcano region singularly free from parasitic fungi.

The third week of the month I spent in North Kohala for the purpose of accompanying the new Forest Ranger, Mr. H. K. Stender, on a general inspection of the Kohala Mountain Reserve and of the proposed addition to that reserve. The cultivation of high altitude cane in the heart of the west end of the Kohala Reserve is greatly to be deplored. Begun as an experiment, this venture has grown to dimensions which constitute a real damage to the forest, a damage which is far too great to be justified by the financial return from a virgin sugar crop. There can be no question that cane cultivation of this sort is a short-sighted policy which is bound to result in ultimate economic loss to the plantation practicing it.

While in Kohala, I killed a crippled bull which had been grazing in the forest reserve for six months while Forest Ranger Denison tried in vain to find its owner. The meat was turned over to the Makapala Nursery and planting crew.

Four days were spent with the Superintendent of Forestry on an inspection of the northwest portion of the Hilo Forest Reserve. We were accompanied by Mr. D. S. Macalister, Manager of Kukaiau Ranch, who furnished horses and equipment for the trip and assisted in finding various boundary lines. The forest in Piha, now protected from grazing for four years, appears in much better condition than the adjoining forest lands which were grazed regularly during that period. In the land of Laupahoehoe mauka a great acreage of akala berries (*Rubus macraei*) was found widely scattered. It would be of value to study the progress of this shrub, whether or not it is increasing at the expense of tree growth, and what its value may be as a large constituent of our water-conservation forest. It occurs already so vigorously and in such large quantities that it is worthy of serious attention. Airplane photographs of such areas would be of striking assistance in studying the occurrence, distribution and spread of the plant.

In Manowaialee, Kaiwiki and Niupea were observed some of the finest ohia forests that I have seen since coming to Hawaii, and it is to be regretted that much of this splendid forest will be subject to grazing, under lease, for eight years longer. Eight years of continuous grazing can do vast damage in an ohia forest, if not indeed cause its complete destruction. It is vital to the plantations which lie below it that this forest be perpetuated as a water-conserving cover. The area should be designated as a forest reserve and placed under absolute protection as quickly as possible.

The last two days of the month were spent with the survey party at Ninole, where steady rain had temporarily delayed the work.

Respectfully submitted,

CHAS. J. KRAEBEL,  
Assistant Superintendent of Forestry.



## REPORT OF THE FOREST NURSERYMAN, JULY, 1921.

Honolulu, Hawaii, August 28, 1921.

Superintendent of Forestry,  
Honolulu, T. H.

Dear Sir:

I herewith submit a report of the work done during the month of July:

## NURSERY—DISTRIBUTION OF PLANTS.

	In transplant boxes.	Pot grown.	Total.
Sold .....	50	95	145
Gratis .....	172	419	591
Total .....	222	514	736

## SUB-NURSERIES.

## Maui and Molokai:

	In transplant boxes.	Pot grown.	Total.
Sold .....	66	26	92

## Kalaheo, Kauai:

	Homesteads.	Plantations, etc.	Total.
Sold .....	750	2,113	2,863

Total for all islands ..... 3,691

## COLLECTIONS GOVERNMENT REALIZATIONS.

Sale of plants, Government Nursery, Honolulu .....	\$ 2.70
Rent of Office Nursery Grounds for July .....	35.00
	<hr/>
	\$37.70

## ANIMAL INDUSTRY REVOLVING FUND.

The sum of \$87.25 was collected and deposited with the Treasurer as a special fund.

## MAIKI STATION.

The work done at this station consisted of mixing and sterilizing soil, transplanting plants, etc.

## FOREST RESERVES.

During the month 245 koa trees were planted on the Honolulu Watershed Reserve. Other work done consisted of clearing ground and planting.

Owing to dry weather there were no trees planted on the Lualualei Forest Reserve. The principal work consisted of hoeing and making holes for trees.

## TRIP TO MAUI.

The writer left Honolulu on July 15, and returned July 19. A visit was made to Lahaina, where we met and consulted with Mr. Collins, Mr. Bowker and Mr. Lyman.

Part of a day was spent looking over the tree planting done by Mr. D. T. Fleming at Honolua. A large number of red gum trees (*Eucalyptus*

*rostrata*) has been planted in the gulches and they are coming along very well. Monterey cypress is also doing well, and Mr. Fleming thinks it is one of the very best trees that can be planted, as it produces a very lasting wood and makes splendid fence posts.

At Wailuku, along with Mr. Penhallow, we visited the plantation nursery and found it stocked with many trees suitable for forest planting and also a quantity of ornamental trees.

The trees planted on the steep slopes above Wailuku are doing very well, and the improvement of the landscape is certainly very noticeable. Mr. Penhallow assured me that he intends keeping up the tree planting.

One day was spent at Haiku with Mr. James Lindsay. The new sterilizer is in good working order and the nursery well stocked with many different kinds of trees. A large number of trees are being set aside and given special care with the view of exhibiting them at the Fair.

#### ADVICE AND ASSISTANCE.

The writer has made the following number of calls and otherwise given advice and assistance at the request of people in and around the city:

Calls made .....	8
Advice given people calling .....	7
Advice given by telephone .....	5

Respectfully submitted,

DAVID HAUGHS,  
Forest Nurseryman.

### DIVISION OF ENTOMOLOGY.

#### REPORT OF THE ENTOMOLOGIST, JULY, 1921.

Honolulu, Hawaii, July 31, 1921.

Board of Commissioners of Agriculture and Forestry,  
Honolulu, T. H.

Gentlemen:

During the month of July the insectary handled 20,300-pupae of the melon fly, from which there were bred 2,808 females and 2,963 males, *Opius fletcheri*.

The distribution of parasites was as follows:

#### MELON FLY PARASITES.

##### *Opius fletcheri*.

	Female.	Male.
Oahu:		
Moanalua .....	750	750
Oahu prison .....	700	700
Maui:		
Kihei .....	250	250

#### FRUIT FLY PARASITES.

##### *Diachasma tryoni*.

Oahu:		
Alewa Heights .....	100	100
Kalihi .....	210	210
Maui:		
Kula .....	200	200

*Diachasma Fullawayi.*

Oahu:		
Alewa Heights .....	50	50
Kalihi .....	150	150
Maui:		
Kula .....	120	120

*Opius humilis.*

Oahu:		
Kalihi .....	200	200
Maui:		
Kula .....	50	50

*Dirhinus giffardi.*

Males and Females.

Oahu:	
Kalihi .....	200
Maui:	
Kula .....	250

*Galesus silvestri.*

Oahu:	
Kalihi .....	200
Maui:	
Kula .....	350

*Tetrastichus Giffardianus.*

Female.      Male.

Oahu:		
Alewa Heights .....	300	....
Kalihi .....	1,400	....
Maui:		
Kula .....	1,600	....

The Entomologist was employed during the month in attending to the direction of field work in Australia, Philippine Islands, Hong Kong and India, and arranging for work in S. W. United States and Mexico. One consignment of dung beetles was received from Mr. Illingworth in Australia, which is being held in the quarantine room of the H. S. P. A. Experiment Station for emergence of adults. Mr. H. F. Willard of the Bureau of Entomology returned on the 27th inst. with beans and pods of *Acacia farnesiana* containing *Bruchus sallei* and its parasites: *Ascana semifumipennis*, *Urosigalphus bruchi*, *Horismenus* sp. *Lariophagus teranus*, *Heterospilus prosopidis*, *Cerambycobius amicus* and *Glyptocolastes bruchivorus*, collected by Mr. J. C. Bridwell of the Bureau of Entomology at Brownsville, Texas, after six months' study of weevil parasitism in this locality. Some of these species are already established in the Islands and have proved very beneficial; it is desired to establish others also, in order to give a greater measure of relief to the bean industry, which suffers heavy losses with each crop by weevil injury. The material brought by Mr. Willard was unpacked in the quarantine room of the H. S. P. A. Experiment Station and the parasites removed. About 400 individuals of *Urosigalphus bruchi* were liberated by Mr. Willard at once, half in a grove of kiawe trees at Ewa, half among klu (*Acacia farnesiana*) at Waialae. The other species are being held for multiplication and further study in the quarantine room of the Board of Agriculture and Forestry, at the Government Nursery. The Entomologist is assisting in this work, and it is intended to release only those species which prove to be primary parasites of strict habit. The rearing and liberating of the fern weevil parasite introduced from Australia has con-

tinued, one small lot being turned out at Kilauea during the month. Further assistance has been given the pineapple interests and considerable work done on the insect collection.

Respectfully submitted,

D. T. FULLAWAY,  
Entomologist.

## DIVISION OF PLANT INSPECTION.

### REPORT OF THE ASSISTANT PLANT INSPECTOR, JULY, 1921.

Honolulu, Hawaii, July 30, 1921.

Board of Commissioners of Agriculture and Forestry,  
Honolulu, T. H.

Gentlemen:

I herewith submit my report of the work carried on by the Division of Plant Inspection for the month of July, 1921, as follows:

During the month 45 vessels arrived at the Port of Honolulu, 25 of which carried vegetable matter, and 5 came by way of the Canal. The following disposal was made of the various shipments:

Passed as free from pests ...	1,636 lots	31,171 packages
Fumigated .....	6 "	6 "
Burned .....	73 "	73 "
Returned .....	20 "	20 "
Total inspected .....	1,735 lots	31,270 packages

Of these shipments 30,955 packages arrived as freight, 241 as baggage and 74 as mail.

### RICE AND BEAN SHIPMENTS.

During the month 1,081 bags of rice and 907 bags of beans from Japan, and 4,600 bags of rice and 3,069 bags of beans from the U. S. arrived. All were passed as free from pests.

### PESTS INTERCEPTED.

Approximately 5,125 pieces of baggage belonging to immigrants from foreign countries were examined, from which 39 lots of vegetables and 21 lots of fruit were seized and destroyed. A tabulated list of material intercepted other than the above-mentioned fruits and vegetables follows:

#### Australia:

July 23—1 pkg. tree seeds, mail for Bd. of Agr., fumigated prec.

#### Bolivia:

July 5—1 pkg. tree seeds, mail for Dr. Lyon, fumigated prec.

#### China:

July 14—2 lots green gourds, baggage, burned, prohibited.

July 14—1 lot dried gourds, baggage, burned, prohibited.

#### Japan:

July 6—1 pkg. corn, baggage, burned, prohibited.

July 6—1 lot 5-leaf pine tree, baggage, burned, prohibited.

July 24—2 lots tree seeds, baggage, burned, prohibited.



## Philippines:

- July 5—1 pkg. seeds, mail from Williams to Dr. Lyon, fumigated prec.  
 July 14—1 lot melon seed, baggage, burned, prohibited.  
 July 24—1 pkg. seed, baggage, burned, prohibited.  
 July 24—3 pkgs. paddy rice, baggage, burned, prohibited.  
 July 24—1 pkg. wheat, baggage, burned, prohibited.  
 July 24—1 pkg. papaya seed, mail, fumigated prec.  
 July 29—5 lots banana plants, baggage, burned, prohibited.  
 July 29—1 pkg. lemons, mail, burned, prohibited.

## Portugal:

- July 24—1 lot vegetable seed, mail, fumigated prec.

## United States:

- July 5—14 cs. peaches, cargo, returned, peach moth.

## HILO INSPECTION.

Mr. Ehrhorn, carrying on the work at Hilo during Bro. Newell's absence, reports the arrival of 8 vessels at the Port of Hilo, 4 of which carried vegetable matter subject to inspection, consisting of 32 lots and 2,320 parcels. Thirteen hundred bags of rice, 248 bags of beans and 25 bags of peanuts arrived from the Orient and were passed.

Mr. Louis Gillin, Inspector at Kahului, reports the arrival of 9 vessels at the Port of Kahului. Two carried vegetable matter, consisting of 17 lots and 1,000 packages, all clean.

## INTER-ISLAND INSPECTION.

Fifty-one steamers plying between Honolulu and other Island ports were attended and the following shipments passed:

Taro .....	153	bags
Vegetables .....	162	pkgs.
Fruit .....	273	"
Plants .....	119	"
Seeds .....	9	"
Sugar cane .....	46	cases

Total passed ..... 762 pkgs.

Thirty-six packages of plants, 2 packages of fruit and 6 pieces of sugar cane were rejected through non-compliance with the regulations, undesirable soil and infestation.

During this month we fumigated 173 bags of rice and 4 cases of books for various local firms.

Respectfully submitted,

L. A. WHITNEY,  
 Assistant Plant Inspector.

## DIVISION OF ANIMAL INDUSTRY.

## REPORT OF THE TERRITORIAL VETERINARIAN, JULY, 1921.

Honolulu, Hawaii, August 10, 1921.

Board of Commissioners of Agriculture and Forestry,  
 Honolulu, T. H.

Gentlemen:

I have the honor to submit the following report on the work of this Division for the month of July, 1921:

For the details of the routine work of the Division, see appended report of the Assistant Territorial Veterinarian.

The number of reactors found in the Waialae Dairy, ten head, after a six months' interval between tests is the lowest ever found in this dairy since testing began. It is my opinion that this is due entirely to the elimination of the nurse cow method of raising their calves. It has been clearly demonstrated that these nurse cows constituted a continual source of infection to the young stock through the milk. A few of these heifers developed lesions of tuberculosis at eight to ten months of age, but the large majority of them did not react until they were from two to four years old. This great source of infection being eliminated, eradication of tuberculosis from this dairy should be rapid.

The live stock importations included thirty head of pure-bred registered Hereford bulls, consigned to Hind, Rolph & Co., for the improvement of the cattle on Mr. Sam Wood's ranch, Island of Hawaii. They were a very uniform bunch of bulls and the finest specimens of the breed imported here for some time.

#### HAWAII.

Dr. Elliot reports the importation of 6 mules and 15 head of grade Holstein cows at the Port of Hilo.

The tuberculosis control work consisted of the testing of 132 head of cattle, of which number 6 were condemned. Five autopsies were made on condemned cattle, and visible lesions of tuberculosis found in four.

A small outbreak of swine plague occurred among the stock of the Hakalau Plantation Company, resulting in the death of 1 boar, 2 sows and 6 sucklings. The outbreak was promptly checked by vaccination.

Dr. Rowat reports the testing of 64 head of cattle, with no reactors. Also the vaccination of 306 head of cattle for hemorrhagic septicemia. Since vaccination no further deaths have occurred and the outbreak can be considered checked.

#### KAUAI.

Dr. Golding reports the vaccination of 249 head of cattle, horses and mules at the Hanalei Ranch and the testing of 138 head of cattle scattered over the Island, for the month of June.

For the month of July, the examination of 138 head of cattle, with 4 reactors, and the testing of 138 head of cattle in plantation camps, with 2 reactors. Autopsies were held on 5 reactors, lesions of tuberculosis being found in each case.

Respectfully submitted,

LEONARD N. CASE,  
Territorial Veterinarian.

#### REPORT OF THE ASSISTANT VETERINARIAN, JULY, 1921.

Honolulu, Hawaii, August 10, 1921.

Dr. Leonard N. Case,  
Territorial Veterinarian,  
Board of Agriculture and Forestry,  
Honolulu, T. H.

Sir:

I beg to submit the following routine report for the month of July, 1921:

#### TUBERCULOSIS CONTROL.

During the month of July, 292 head of cattle, belonging to five dairies,

were tested for tuberculosis and 12 head condemned. Thirty-two head of condemned cattle were autopsied at the time of slaughter.

### DISTEMPER TREATMENT.

Two dogs received at the Quarantine Station were given the prophylactic treatment for distemper prior to receiving the anti-rabies treatment.

### RABIES TREATMENT.

Seven dogs were given the anti-rabies treatment during the month.

### CHICKEN SORE-HEAD.

Five hundred cc. chicken sore-head vaccine were prepared in the laboratory and distributed to various poultry owners.

### IMPORTATION OF LIVE STOCK.

Of the twenty-four steamers inspected, the following eleven brought live stock to this port:

#### S. S. FLORIDIAN, Seattle.

1 Airedale dog ..... Dr. F. E. Trotter

#### S. S. MAUI, San Francisco.

1 Airedale dog ..... Lt. Gibson

#### S. S. SIBERIA MARU, Orient.

5 ets. pheasants ..... Oahu County

2 game cocks ..... G. Tsukiyama

#### S. S. WILHELMINA, San Francisco.

1 Airedale dog ..... S. K. Silva

#### U. S. S. PENGUIN, San Francisco.

1 Collie dog ..... E. R. Spear

#### S. S. MATSONIA, San Francisco.

2 cats ..... American Railway Express Co.

#### S. S. MAUNA KEA, Hilo.

2 Holstein bulls ..... M. T. Brazon

3 cows ..... John Teixeira

#### S. S. HYADES, San Francisco.

2 Berkshire hogs ..... Alexander & Baldwin, Ltd.

30 Hereford bulls ..... Hind, Rolph Co.

15 Holstein cows ..... K. B. Porter

1 Ayreshire cow ..... Kauai Fruit & Land Co.

22 mules ..... Schuman Carriage Co.

31 ets. poultry ..... Various

S. S. MANUKAI, San Francisco.

10 cts. poultry ..... Chang Bros.

S. S. MAUNA KEA, Hilo.

1 cow ..... M. Solado

S. S. MANOA, San Francisco.

1 Fox hound ..... Dr. A. B. Glaisyer  
143 cts. poultry ..... Various

Respectfully submitted,

L. E. CASE,  
Assistant Territorial Veterinarian.



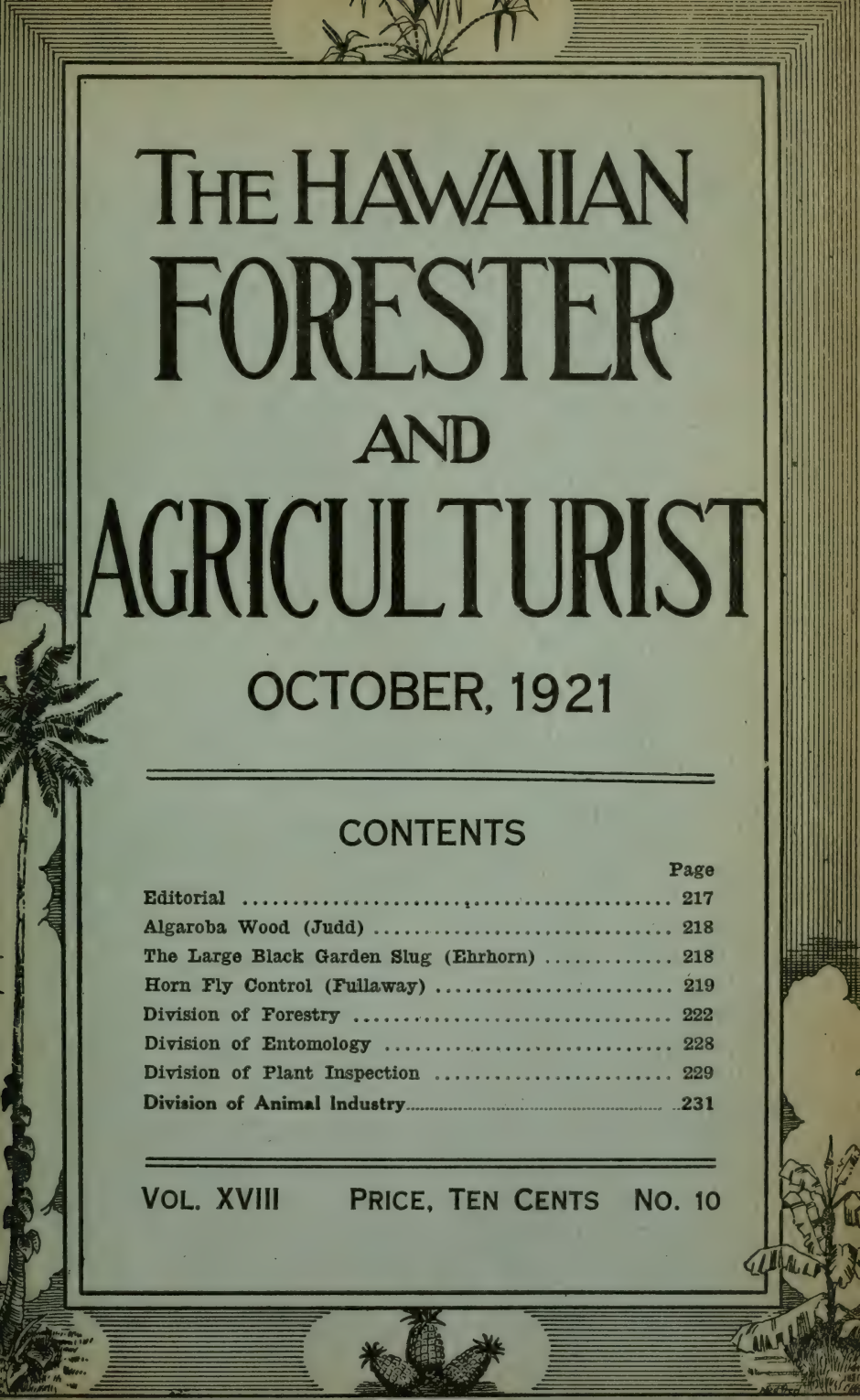












# THE HAWAIIAN FORESTER AND AGRICULTURIST

OCTOBER, 1921

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# The Hawaiian Forester and Agriculturist

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and Agriculture

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(1921)

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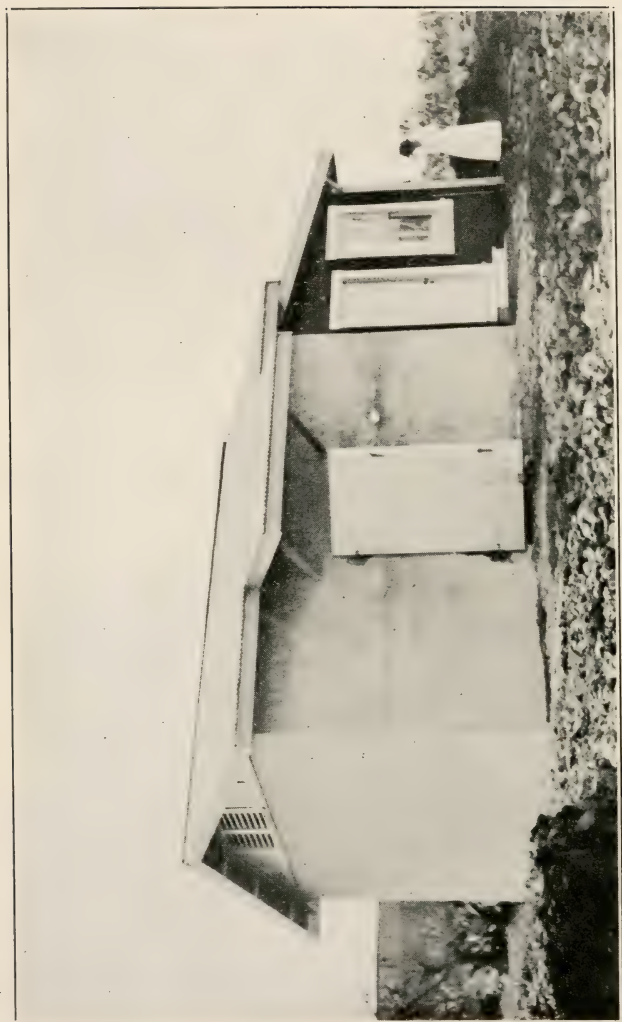
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New Plant Fumigation Building of the Division of Plant Inspection near Kuhio Wharf, Hilo, Hawaii.

# THE HAWAIIAN FORESTER AND AGRICULTURIST

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VOL. XVIII.

HONOLULU, OCTOBER, 1921.

NO. 10

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A brief statement of the calorific power of algaroba wood is contained in this number.

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The fencing of forest reserve boundaries continues, and the average progress of recent work of this nature amounts to over two miles per month.

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A statement by Entomologist Fullaway of the progress made in recent work on the horn fly control in the Territory is printed in this number.

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As one of the results of the Superintendent of Forestry's two months' visit to the Island of Hawaii, approximately 29,000 acres of vacant government forest land will soon be added to the present forest reserves on that island.

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The large round black seeds of the native *manele* or soapberry tree (*Sapindus saponaria*) are much in demand for necklaces. A quantity of this seed was recently secured by the Superintendent of Forestry from near the Volcano House on Hawaii and planted at the Government Nursery. These have germinated well and will soon be planted out on forest reserves.

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The new plant fumigation building of the Division of Plant Inspection, completed on September 1, 1921, on government land near Kuhio wharf, Hilo, and pictured in this number, consists of a 20 by 20 foot concrete fumigation vault, a 10 by 10 foot wood office, and a storage shed. This Division is now in a position to handle infested shipments of rice, beans and other commodities and to give greater entomological protection to the big island.

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Hawaii can boast of an arctic climate even in summer, for a trip to the summit of Mauna Kea and a night at Waiau Pond at 13,000 feet above the sea enables one to experience freezing weather, even in August. The Superintendent of Forestry plans to establish a small grove of lodgepole pine trees at this pond, and if the venture is a success the traveler to this highest island mountain in the world will be able to spend a more comfortable night near the summit.

ment of their progeny, reared up a small colony in confinement from the original examples and liberated them in Manoa Valley near the Salvation Army Home. The larger species failed for the most part, owing to the lengthy period passed as larvæ in the soil under very unnatural conditions, and liberations in their case were impossible.

In May of the present year an engagement was made with Mr. J. F. Illingworth, formerly Professor of Entomology at the College (now University) of Hawaii, and more recently Entomologist with the Queensland Government, to collect tumble bugs and other horn fly enemies in Australia, and in carrying out this engagement Mr. Illingworth made four consignments of tumble bugs, chiefly *Onthophagus pugnax*, a large species, as larvæ or grubs, in which state they inhabit the interior of balls of manure buried in the soil. These consignments arrived on June 14 and August 16, 1921, on the "Ventura," and on July 12 and September 13, on the "Sonoma" (the last personally conducted). It should be stated here that these consignments were not the first made from Australia, as both Koebele and Williams on previous occasions had sent Australian species to Hawaii. But their shipments consisted entirely of adults, and as the species introduced failed to establish themselves here it was considered probable that the beetles were weakened by the confinement experienced during their transportation or were senile at the time they were collected.

Mr. Illingworth in the years of his residence in Australia had investigated thoroughly the habits of the tumble bugs, and a result of his study was the realization of an advantage in collecting and shipping material in the larval state; for he saw that not only could an abundance of material be gathered at any season, when larval cells are sought rather than adults, but it could be got across to Hawaii without loss or injury in the immature condition, which, as already stated, was not possible otherwise, and it was believed further that the beetles on issuing from the cells in which they had developed would be fresh, and ready to go to work immediately on manure.

But an unanticipated difficulty arose when the material reached Hawaii, from the slow progress of the larvæ in maturing. This, it was realized, would be of no consequence if the cells containing the larvæ could be placed in the ground in situations similar to those from which they had been removed, but such a procedure could not be considered for a moment on account of the foreign soil adhering to the cells, which might contain nematodes or even other insects inimical to agriculture. As a matter of fact, we were advised by Mr. Illingworth of the presence of a small beetle in the material, which in Australia detracts greatly from the effectiveness of the tumble bugs by interfering with their development, and were able to intercept and dispose of it so that it could not reproduce its kind here. Consequently, it was necessary to hold the cells in quarantine





Prize Hereford Bull on the Parker Ranch, Hawaii, molested by a swarm of horn flies.



One of the Tumble Bugs (*Copris colonicus*) imported from Arizona to assist in combatting the horn fly scourge.



while the development proceeded, at great risk of loss, considering the long period occupied by the development, during which the conditions surrounding the larvæ were quite artificial. However, after four months of anxious waiting, with frequent examination of the interior of individual cells, sacrificed to gain a knowledge of the state of development, adults appeared in September, and continued to disclose themselves until the end of October. In all 300 were recovered, which were liberated on the Parker Ranch, on the Island of Hawaii, at the Wahinekea Station, 50 on the 29th of September, 50 on the 13th of October and 200 on the 28th of October.

These beetles when taken out of their cells were placed in jars with sand and manure, but showed no activity whatsoever in respect to the manure. Presumably they were not sexually mature and will not bury manure until this maturity is reached.

In addition to the tumble bugs, Mr. Illingworth brought or sent from Australia a number of other horn fly enemies: several species of *Staphylinid* beetles, a large *Silphid* beetle, and an *Histerid* beetle, all predatory on the immature stages of dung flies, which were liberated principally on the Parker Ranch, under conditions favorable to their acclimatization and establishment.

Our experience with the Australian material has changed opinion somewhat regarding the desirability of introducing larvæ of tumble bugs, and as a result it has been decided to seek the tumble bugs at closer range, in order to go back to the practice of introducing adults and at the same time get them without loss and in a fairly fresh condition.

In September of the present year Mr. H. T. Osborn, of the H. S. P. A. Experiment Station staff, was employed to collect and ship horn fly enemies from southwest United States. From this region desirable species can be transported to Hawaii in ten days. Mr. Osborn has been working in the neighborhood of Nogales, Arizona, and in Imperial Valley, California, and has made to date four shipments, two from Imperial Valley arriving here on the 5th and 19th of October, respectively, and two from Nogales arriving here on the 1st and 8th of November, respectively.

The shipments from Imperial Valley included *Staphylinid* beetles, which are predatory on the immature stages of the horn fly, and *Spalangia*, *Eucolia*, etc., internal parasites of the same.

Those from Nogales included two species of tumble bugs, *Copris colonicus* and *Copris remotus* in large numbers, together with a few individuals of a small *Canthon* and a metallic *Phæneas*, a black *Hister* in numbers, and a *Spalangia* and a small *Eucolia*. Mr. Osborn's engagement is for a period of one year, so that many more consignments should be received from him. It is considered desirable to give the American species a thorough trial before attempting any new procedure.

## DIVISION OF FORESTRY.

### REPORT OF THE SUPERINTENDENT OF FORESTRY, AUGUST, 1921.

Honolulu, Hawaii, September 19, 1921.

Board of Commissioners of Agriculture and Forestry,  
Honolulu, T. H.,  
Gentlemen:

I respectfully submit the following report of the Division of Forestry for the month of August, 1921:

#### FOREST PLANTING.

Owing to the dry weather, the setting out of trees was somewhat restricted during the month, but amounted to a total of 2,216 trees planted. The majority of this work was done in the Waiahole Forest Reserve, Oahu, where the following trees were planted: Cook pine (*Aracaria Cookii*) 785, Japanese cedar (*Cryptomeria Japonica*) 169, Queensland nut (*Macadamia ternifolia*) 240, Bermuda juniper (*Juniperus Bermudiana*) 189, koa 150, and mahogany 431. In upper Makiki Valley, within the Honolulu Watershed Forest Reserve, 240 koa trees were planted and in Sec. C. of the Olaa Forest Park Reserve, at 18 Miles on the Volcano Road, Hawaii, 12 lemon gum trees were planted by Ranger Mackenzie as a beginning of the improvement of forest reserve land that he is fencing in at this place. Weather conditions were too dry to permit of tree planting in the Lualualei Forest Reserve on Oahu.

On the last day of the month a few seed beds were prepared at the Kilauea Ranger Station on Hawaii, at 29 Miles in Olaa, and in them were sown seed of the deodar cedar, bald cypress, osage orange and Hawaiian koa. In the open places in this same reserve—Sec. B. of the Olaa Forest Park—15 pounds of koa seed were broadcasted in the attempt to increase the proportion of koa on the area. There were also planted and properly labelled on this area single specimens of two chaulmoogra trees—*Taraktogenos Kurzii* and *Hydrocarpus castanea*—and a karaka tree, *Corynocarpus lacrigata*. This planting is in the nature of an experimental arboretum.

A quantity of seed of the a'e or manele (*Sapindus saponaria*) was secured from the large trees in Kipuka Puaulu, in the Kilauea Section of the Hawaii National Park, and forwarded to the Government Nursery in Honolulu for propagation.

#### FOREST FENCING.

The construction of new fences and repairing of old fences during the month or not previously reported amounted to 2.09 miles, as follows:

Ranger Mackenzie repaired .55 mile of fence in Sec. A. and 1.05 miles of fence in Sec. C. of the Olaa Forest Park Reserve on Hawaii. On the boundaries of the Kealia Reserve on Kauai, Ranger Lovell repaired .10 mile of fence. At 24 Miles, S. Kanamori built 300 feet more of the hog-proof fence along the Olaa Forest Reserve boundary required by a general lease. During July, Joe Rita Jr., in charge of the Kalaheo Nursery on Kauai, used the material from an old fence and constructed a new fence on the proper forest reserve line on the Wahiawa-Kalaheo boundary amounting to .33 mile in length.

On August 24, Ranger Mackenzie began the construction of half a mile of fence on forest reserve boundaries on the Volcano Road, Hawaii, at 18 Miles, and arrangements were made with Nicholas Holowaty to begin the construction of approximately 3 miles of fence adjacent to his leased land and homesteads on the boundary of the Olaa Forest Reserve, Hawaii, back of 22-24 Miles. This fence will connect up with the fence that S. Kanamori is constructing. The line of the latter was rerun and



pped during the month, the original survey cutting of two years ago being almost completely obliterated by the rank growth of ferns.

### FOREST FIRES.

The following fires were reported during the month:

*August 9, 1921:* Waianae-uka, Oahu. As a result of artillery practice, a fire occurred on the south slopes of Maili Hill, but was extinguished by the army. An area of 30 acres of grass land, with a few trees in the gulches, was burned over.

*August 10, 1921:* Kapapala, Hawaii. A personal investigation was made of a fire that had been burning for a week near the Mauna Loa trail a few miles below Camp Bates. It had been started by cowboys to clear out a thicket of pukeawe, where cattle were wont to hide, in a small gulch surrounded by an a-a lava flow and open country. A fire was smoldering in old logs and duff. A fire line was scraped around the burning area, which was thus made safe, and in a few days the fire went out altogether.

*August 17, 1921:* Waioli, Kauai. Fire Warden W. F. Sanborn reported a small fire which burned over 2 acres in the forest reserve on a steep ridge. It was reported to have been set in connection with the illicit distilling of liquor, and the cause of the fire is still under investigation. Heavy showers in the mountains extinguished the fire that night.

*August 31, 1921:* Waianae-uka, Oahu. Another fire started at 3:50 p. m. on the slopes of Maili Hill from an unknown cause and burned over 7 acres of grass land before it was extinguished by the army that same night.

Mr. L. von Tempsky has resigned as District Fire Warden for Kula and Kaupo, and Mr. John Chalmers as District Fire Warden for Hana, Maui. Recommendations for the appointment of their successors will be submitted in a separate communication.

### WORK ON HAWAII.

I remained on the Island of Hawaii during the entire month of August to complete the inspection of lands in the Hilo Forest Reserve, to check up fencing as required by general leases and homestead agreements, and to explore government forest lands with a view to adding them to the present forest reserve system. The latter work will result in the inclusion of approximately 28,900 acres of additional forest land in the reserves, distributed as follows: 2,500 acres added to the present Hilo Forest Reserve; 15,000 acres added to the present Upper Waiakea Forest Reserve; 9,690 acres of unleased government forest land in Waiakea, between the Panaewa and Upper Waiakea Reserves and the Waiakea homestead tract, to be set aside as the new Waiakea Forest Reserve; and approximately 1,710 acres of heavy forest in Manowaialee, Kaiwiki and Niupea in the District of Hamakua to be set aside subject to existing leases, as the new Manowaialee Forest Reserve. As soon as descriptions and maps of these areas are received from the Surveyor, they will be submitted to you with detailed reports recommending the setting apart of the lands as forest reserves.

### HILO FOREST RESERVE.

The work of delineating the makai boundary and surveying additional areas to be included in the Hilo Forest Reserve continued during the month and resulted in the running of 7.5 miles from Pohakupuka Stream to Kaula Gulch at the extreme north corner of the reserve. A visit was made to the survey crew and the boundary line was inspected across the lands of Pihoonua, Waipunalei, Piha, Opea Peleau and Kaiwiki 3.

## FENCING REQUIREMENTS.

During the course of my forest inspections the following instances of unfulfilled fencing requirements or of incorrectly located fences came to my attention and were at once reported to the Commissioner of Public Lands with the suggestion that he compel the lessee or homesteader to comply at once with the fencing requirements on the proper lines:

1. Waiakea homestead lot 1417, Mrs. Salai K. Kahoa. No fence on the mauka boundary of her lot and cattle found roaming mauka of her homestead in the government forest around the flume heads.

2. Waiakea homestead lot 1517, Isabella N. Keanu. Same condition as above.

3. Kau Forest Reserve, lower southwest corner, at Waikaaloa, required by general lease 550 of Kiolakaa to Hutchinson Sugar Plantation Co. to be fenced. Fence found in poor condition and not stock-proof, with large opening and no gate, so that cattle were getting into the reserve.

4. Hilo Forest Reserve. Weloka, general lease 946 to Laupahoehoe Sugar Co. Supposed to be adjacent to makai forest reserve boundary, but upper fence of lease found to be about 700 feet mauka in the forest reserve.

5. Hilo Forest Reserve. Laupahoehoe, general lease 926 to M. P. Silva. Very frail fence found to be 1,330 feet at the NW. corner and 742 feet at the SW. corner mauka of the correct forest reserve boundary, and as a result about 98 acres of forest reserve land were being illegally grazed and the forest cover thereon destroyed.

6. Hilo Forest Reserve. Adjacent lot 51 of the Hakalau-iki homesteads, held under general lease 984 by Rose de Lima. Inadequate fence on mauka line of her lease, which allows cattle to get into the forest.

## MAUNA KEA TRIP.

On August 5 and 6, I visited the Mauna Kea Forest Reserve, in company with my assistant and six others, for the purpose of determining upon experimental planting with temperate zone trees and of making scientific observations in this high country. The mamani forest between 7,700 and 10,000 feet, the upper timber line, was found to be in good condition. Two wild cattle and a band of wild sheep were seen, but no wild horses, although a band of the latter are occasionally seen on the mountain. Six wild sheep were killed on the trip. It is possible that conifers will succeed on the lower slopes of this reserve if planted at times of favorable moisture, but there are not sufficient funds available at present for this work. At Waiau Pond, near the summit at 13,014 feet, where our party experienced a cold night and the temperature was as low as 18 degrees, causing a film of ice to form on the edges of the pond, it is planned to start a small grove of lodgepole pine trees by seed spotting, so that in time fuel wood will be available for travelers who ascend the mountain. For this purpose an order of 20 pounds of seed has been placed with the Forest Service at Portland, Oregon. The presence of numerous cinder cones superimposed on glacial drift all over the summit plateau of the mountain was found to be of great interest.

## COÖPERATION WITH H. S. P. A.

One day was spent in writing a report at the request of the Chairman of the Committee on Forestry of the H. S. P. A., to be considered at the next annual meeting of that association. The topics touched on included suggestions that the forest work of that association be concentrated on protecting the native forest by fencing as being of greater importance at present than artificial reforestation for the conservation of water, that the field force be strengthened, that the administration of

lands in forest reserves under the control of members of the association be concentrated, and that more attention be given where needed to raising wood for fuel.

Respectfully submitted,

C. S. JUDD,  
Superintendent of Forestry.

**REPORT OF ASSISTANT SUPERINTENDENT OF FORESTRY,  
AUGUST, 1921.**

Hilo, Hawaii, September 5, 1921.

Superintendent of Forestry,  
Honolulu, T. H.

Dear Sir:

I respectfully submit the following routine statement of my work during August, 1921.

**BOUNDARY SURVEY.**

At the end of the month the survey of the makai boundary of the Hilo Forest Reserve had reached the point in Kaula Gulch called "Paeopu," which is the extreme north corner of the reserve and therefore the end of the makai boundary. The distance covered by Mr. Hockley's party during August is approximately 7.5 miles, extending from Pohakupuka Stream at Waikaumalo to Kaula Gulch between the lands of Ookala and Manowaialee. At Waipunalei Mr. Hockley found it necessary to make a complete resurvey of lots 12 and 13 of the Kahoahuna Homesteads in order to correct an error in the original survey and to determine the forest boundary in that vicinity. In the course of the month's work several irregularities in the location of fences were disclosed. The mauka fence of lot 55, Waikaumalo Homesteads is several hundred feet mauka of its correct position, infringing thus upon the Robertson Estate land of Mauluanui. In Laupahoe, the mauka fence of the government remnant under general lease 946 is approximately 700 feet mauka of the true boundary; while on the government remnant under lease 926 the present fence is 342 feet mauka at the south end and 1,330 feet mauka at the north end of its true location. In Waipunalei, because of the peculiar status of that land at present, I requested the surveyor to carry the line straight across this land from the west corner of the land under lease 926 to the newly established south corner of lot 13, Kahoahuna Homesteads. The land of Waipunalei cannot be regarded as forest reserve at present, since the upper portion constitutes a paddock of the Parker Ranch and the lower portion is used as a pasture by homesteaders under permit from the Laupahoe Sugar Company. The effect of this use is to separate the forest in the government land of Humuula from the remainder of the Hilo Reserve, a condition which should be corrected as soon as possible.

At the end of the month the following portions of the boundary survey remained still to be done: From Hanawai Stream in Papaikou to Puu Kauku, a distance of about two miles; the final line of 1.2 miles across Piihonua and Waiau from Hookelekele Stream to Aale Stream; the inclusion of the area of Piihonua lying between Hookelekele Stream, Wailuku River, and the land of Punahoa 2; determination of the Punahoa 2-Piihonua boundary from the Wailuku River to the top of the land of Punahoa 2, approximately 7 miles of straight line.

**PARKER RANCH.**

On August 1, in company with the Chief Plant Inspector, I drove to Waimea to consult with Mr. Carter on the forestry problems of the Parker Ranch. The ranch is well equipped to raise in its own nursery all the common species of trees for windbreak purposes, but Mr. Carter is anxious to be supplied with the less common introduced species for



experimental planting. This is an excellent opportunity for experimentation in a thorough manner and on a scale which the Division of Forestry is unable to practice independently. There is almost no limit to the range of climatic conditions which can be found on the Parker Ranch, and Mr. Carter would be at pains to help us find the most favorable site for each species. The conifer plots established ten years ago on the slopes of Mauna Kea are examples of the excellent results which can be obtained by this sort of coöperation.

At the time of our visit there were some 300,000 transplants in the ranch nursery, including the genera *Eucalyptus*, *Acacia*, *Aracaria*, *Cupressus* and *Pinus*. It is obvious that such vigorous efforts in forestry deserve our most hearty support.

#### MAUNA KEA EXPEDITION.

During the first week of the month I made the ascent of Mauna Kea with a party of government officials and scientific men, including the Chief of the U. S. Geological Survey for Hawaii, the Territorial Land Commissioner, the Director of the B. P. Bishop Museum, and the Superintendent of Forestry. The purposes of the expedition were several, centering chiefly about the problem of mapping the mountain, and about the reported evidences of ancient glaciation above the elevation of 11,000 feet, which was Professor Gregory's principal concern. Unmistakable evidences of glaciation were found and a plan for further study was developed by Professor Gregory.

#### MISCELLANEOUS.

During the second week I visited the Kalapana region of Puna with Mr. Ehrhorn and secured photographs of forest and dune conditions.

In company with the Superintendent of Forestry, the Commissioner of Public Lands, and the manager of the Hawaii Mill Company, I went over the newly established forest reserve boundary across the land of Piipihonua in order to discuss on the ground the conditions of the proposed new lease of cane lands which relate to the problem of forest administration. During this trip a plan for the planting of open areas in the forest reserve was developed.

With the Superintendent of Forestry and Mr. Bryan, Forest Ranger for the H. S. P. A., I spent two days inspecting the line of survey of the Hilo Reserve boundary across the lands of Waipunalei, Laupahoe, Piha, Opea, Kamae, Hakalau and Kaiwiki.

Several days were spent with Mr. Bryan examining the area to be included in the proposed Manowai Forest Reserve above Ookala. It appears that the forest in much of the area is irregular in density, due to an old forest fire, and that some planting will have to be done to restore the region to a proper density for water-conserving purposes. Several discrepancies in the old surveys were uncovered, and these were brought to the attention of the surveyor for correction in the final work.

#### PINE TREES ON MAUNA KEA.

During the fourth week of the month I coöperated with Dr. H. E. Gregory of the Bishop Museum on a trip up the northwest slope of Mauna Kea. Dr. Gregory's object was to secure further evidence of glaciation on the mountain, while I went to inspect the conifer plots established in February, 1910, by Mr. Hosmer. Both objects were very gratifyingly realized. Abundant evidences of glaciation were found and numerous photographs of striations, moraines and ice-distributed boulders were obtained.

The tree plot at the lowest elevation, 7,000 feet, contained a total of 201 thrifty trees, ranging in size from 6 feet to 20 feet, and including the following species: *Pinus coulteri*, *Cedrus deodara*, *Libocedrus decurrens* and *Pinus jeffreyi*, named in order of their vigor of growth. At 9,000 feet



Coulter pine again showed the best growth of all species, but the total number of living trees was only 46. At 11,000 feet, the highest plot, only a single stunted tree was found, an incense cedar. Further experimentation at this altitude is therefore inadvisable at present. The results on the whole, however, are very encouraging, since it is demonstrated that lumber-producing trees can be successfully grown at the intermediate altitudes. Numerous photographs were taken at all the plots and specimens of all species were also taken for the office herbarium. An exhibit of these, with explanatory placards, was placed in a store window in Hilo and remained there during the recent American Legion Convention in the city.

Respectfully submitted,

CHAS. J. KRAEBEL.

Assistant Superintendent of Forestry.

### REPORT OF FOREST NURSERYMAN, AUGUST, 1921.

Honolulu, Hawaii, September 9, 1921.

Superintendent of Forestry,

Honolulu, T. H.

Dear Sir:

I herewith submit a report of the work done during the month of August.

#### NURSERY—DISTRIBUTION OF PLANTS.

The number of plants distributed, including those sent to forest reserves, is as follows:

	In Transplant Boxes.	Pot Grown.	Total.
<b>Oahu:</b>			
Sold .....	.....	151	151
Gratis .....	6,075	2,276	8,351
	6,075	2,427	8,502

#### SUB-NURSERIES.

<b>Maui</b> .....	250
<b>Kauai</b> .....	806
<b>Hawaii</b> .....	6,968
<b>Hawaii</b> (July—not previously reported) .....	4,700

#### COLLECTIONS—GOVERNMENT REALIZATIONS.

Sale of plants, Government Nursery, Honolulu .....	\$ 4.05
Sale of Plants at Kalahoe Nursery, Kauai .....	10.00
Rent of Office, Nursery Grounds, for June and July .....	70.00
	<hr/>
	\$84.05

#### MAKIKI STATION.

At this station we have just installed a new 9 horse power engine, the 5 horse power engine which we have been using for some time we intend installing at the Hilo Nursery to be used for cutting up wood for seed and plant boxes, etc.

Other work done has been principally routine.

Dr. H. L. Lyon of the H. S. P. A. turned over to us for the use of the Board the following chaulmoogra trees: 1659 *Hydnocarpus anthelminticus*, and 1083 *Taraktogenos Kurzii*.

#### HONOLULU WATERSHED.

During the month 240 koa trees were planted; other work done consisted of making holes and clearing. The working gang has been transferred to the lower end of Makiki Valley to clear off the lantana, guava bushes, etc., in preparation for the coming planting season.

## ADVICE AND ASSISTANCE.

The writer has been called upon to visit Ewa Plantation for the purpose of assisting in the laying out and planting of trees, etc., around the new Korean camp.

Requests from different officers at Schofield Barracks for advice and assistance are on file and visits will be made when time permits.

Calls made .....	8
Advice given people calling .....	10
Advice given by telephone .....	5

Respectfully submitted,

DAVID HAUGHS,  
Forest Nurseryman.

## DIVISION OF ENTOMOLOGY.

## REPORT OF ENTOMOLOGIST, . AUGUST, 1921.

Honolulu, T. H., September 14, 1921.

Board of Commissioners of Agriculture and Forestry,  
Honolulu, T. H.,

Gentlemen:

During the month of August the insectary handled 17,100 pupæ of the melon fly, from which there were bred 3,249 females and 3,024 males, *Opius fletcheri*.

The distribution of parasites was as follows:

## MELON FLY PARASITES.

*Opius fletcheri*.

	Females.	Males.
Oahu:		
Kalakaua Avenue .....	700	700
Moanalua .....	850	850
Oahu Prison .....	400	400

## FRUIT FLY PARASITES.

*Galesus silvestri*.

	Males and Females.
Oahu:	
Kalihi Valley .....	800
Keeaumoku Street .....	300

*Dirhinus giffardi*.

Oahu:	
Kalihi Valley .....	600
Keeaumoku Street .....	200

*Diachasma tryoni*.

	Females.	Males.
Oahu:		
Kalihi Valley .....	300	300
Keeaumoku Street .....	250	250
Kaimuki .....	150	150

*Diachasma fullawayi*.

Oahu:		
Kalihi Valley .....	150	150
Keeaumoku Street .....	100	100
Kaimuki .....	100	100

*Tetrastichus giffardianus.*

## Oahu:

Kalihi Valley .....	1,600	...
Keeaumoku Street .....	700	...
Kaimuki .....	650	...

*Opius humilis.*

## Oahu:

Kalihi Valley. ....	100	100
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## CORN LEAF HOPPER PARASITES.

## Hawaii:

Keauu Ranch .....	1,000	...
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The Entomologist was employed during the month in attending to the direction of field work in Australia, Philippine Islands, Hong Kong and India, and arranging for work in South West United States and Mexico.

Another consignment of dung beetles was received from Mr. Illingworth in Australia, including large and small species of *Staphylinidae*, a medium sized *Histerid* and a large *Silphid*, all predatory on dung-inhabiting maggots, in addition to several kinds of coprophagous beetles. These were liberated on the Parker Ranch, on the Island of Hawaii, and at the same time 15 additional individuals of the fern weevil parasite were liberated at 29 Miles, Olaa, in the infested area of Mr. C. S. Carlsmith's lot. A consignment of fig insects also came during the month, forwarded by Mr. H. Green, Superintendent Botanic Gardens, Hong Kong, Marcotted plants of *Ficus retusa* were expected, but on opening the cases the plants proved to be *Ficus hispida*, all of which had succumbed during the long passage save one, which held about eight figs in good condition. From these there emerged 30 individuals of the fertilizing fig wasp attached to this species of fig, which were liberated on the single mature tree of *Ficus hispida*, in the Hillebrand gardens on Nuuanu Street, on the responsibility of the Entomologist. It is desired to have the formal approval of the Board in regard to this action, which was taken at the request of Dr. Lyon of the H. S. P. A. staff and upon the understanding that the insects were still subject to quarantine (that is, all the fruits on the tree could be destroyed in case it was desired to suppress this particular species), and to have *Ficus hispida* placed on the list of desirable species.

Spare moments have been devoted to re-arranging and classifying specimens in the insect collection, to an exhibit at the Maui agricultural fair, and to planning coöperation work with the College of Hawaii on spraying, etc.

Respectfully submitted,

D. T. FULLAWAY,  
Entomologist.

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## DIVISION OF PLANT INSPECTION.

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### REPORT OF THE CHIEF PLANT INSPECTOR.

Honolulu, Hawaii, August 31, 1921.

Board of Commissioners of Agriculture and Forestry,

Honolulu, T. H.,

Gentlemen:

I herewith submit my report of the work carried on by the Division of Plant Inspection for the month of August, 1921, as follows:

During the month 46 vessels arrived at the Port of Honolulu, 27 of which carried vegetable matter, and 3 came by way of the Canal. The following disposal was made of the various shipments:

Passed as free from pests ....	2,142 lots	41,221 packages
Fumigated .....	105 "	105 "
Burned .....	44 "	44 "
Returned .....	67 "	67 "

Total inspected ..... 2,358 lots ' 41,437 packages

Of these shipments 41,081 packages arrived as freight, 276 as baggage and 180 as mail.

### RICE AND BEAN SHIPMENTS.

During the month 9,672 bags of rice and 1,193 bags of beans from the U. S., and 523 bags of rice and 997 bags of beans from Japan arrived. All were passed as free from pests.

### PESTS INTERCEPTED.

Approximately 3,154 pieces of baggage belonging to immigrants from foreign countries were examined, from which 17 lots of fruit and 15 lots of vegetables were seized and destroyed. A tabulated list of material intercepted other than the above mentioned fruits and vegetables follows:

#### Australia:

August 16—1 lot ficus seed, mail, H. S. P. A. from Pemberton, CS<sub>2</sub> precautionary.

August 16—1 pkg. passion fruit seed, mail, CS<sub>2</sub> precautionary.

#### China:

August 25—1 lot beans, baggage, CS<sub>2</sub> precautionary.

August 27—1 lot cypress leaves, baggage, burned, prohibited.

August 27—1 lot pine leaves, baggage, burned, prohibited.

#### Fanning Island:

August 9—98 cocoanuts, cargo, CS<sub>2</sub> precautionary.

#### Japan:

August 7—1 pkg. plant, baggage, burned, prohibited.

August 7—1 lot chestnuts, baggage, CS<sub>2</sub>, weevils.

August 23—1 lot tree seeds, baggage, burned, prohibited.

#### Philippines:

August 23—1 pkg. seeds, mail, Lyon from Williams, CS<sub>2</sub> precautionary.

August 23—1 pkg. corn, mail, burned, prohibited.

August 25—1 lot bark, baggage, burned, prohibited.

August 25—2 lots corn, baggage, burned, prohibited.

August 27—1 lot paddy rice, baggage, burned, prohibited.

#### Porto Rico:

August 28—4 lots mango seed, baggage, burned, prohibited.

August 28—1 lot tree seed, baggage, burned, prohibited.

August 28—1 lot cotton seed, baggage, burned, prohibited.

August 28—1 lot vegetable seed, baggage, burned, infestation.

August 28—2 lots lemons, baggage, burned, prohibited.

August 28—3 lots limes, baggage, burned, prohibited.

#### United States:

August 30—64 bx. peaches, cargo, returned, peach moth.

### HILO INSPECTION.

The undersigned returned from Hilo on August 23, leaving I. K. Joshua to look after Brother Newell's work until his return. Owing to illness, and with the sanction of the Executive Officer, Brother Newell has been granted two weeks further leave, returning to Hilo by September 16. During August 9 vessels arrived at the Port of Hilo, 3 of which carried vegetable matter, consisting of 22 lots and 1832 parcels, all free from infestation.



During my presence in Hilo I paid close attention to the erection of the new fumigating building near Kuhio wharf, and when I left the building was almost completed. The Executive Officer no doubt has carefully gone over the building while at Hilo.

#### KAHULUI INSPECTION.

Mr. Louis Gillin, Inspector at Kahului, reports the arrival of 8 vessels at the Port of Kahului. Two carried vegetable matter, consisting of 16 lots and 937 parcels, all clean, with the exception of a crate of celery and a crate of pears. These were destroyed, as they were found to be badly infested with rot and decay mites.

#### INTER-ISLAND INSPECTION.

Fifty-four vessels plying between Honolulu and other Island ports were attended and the following shipments passed:

Taro .....	140 bags
Vegetables .....	77 pkgs.
Fruit .....	227 "
Plants .....	105 "
Seeds .....	7 "
Total passed.....	556 pkgs.

Twenty-six packages of plants, 1 package of fruit and 1 package of sugar cane were rejected through non-compliance with regulations, undesirable soil and infestation.

Respectfully submitted,

E. M. EHRHORN,  
Chief Plant Inspector.

### DIVISION OF ANIMAL INDUSTRY. REPORT OF TERRITORIAL VETERINARIAN, AUGUST, 1921.

Honolulu, Hawaii, September 12, 1921.

Board of Commissioners of Agriculture and Forestry,

Honolulu, T. H.,

Gentlemen:

I have the honor to submit the following report for the month of August:

#### TUBERCULOSIS CONTROL.

The testing during the month was confined to imported cattle at the Quarantine Station. Out of a total of 68 head, 4 were condemned. These four animals exhibited definite and in one case advanced lesions of tuberculosis on autopsy.

#### HEMORRHAGIC SEPTICEMIA.

Four distinct outbreaks of hemorrhagic septicemia of a very virulent type occurred in dairy cattle during the past month. One outbreak occurring in Kaimuki and three in Kapahulu.

Vaccination was resorted to with uniformly good results; only two deaths occurring after vaccination. All cattle in the surrounding neighborhood were immunized, and the outbreak may be considered entirely checked.

## CONTAGIOUS EPITHELIOMA.

About 2,000 mil of vaccine for this disease of poultry has been prepared in the laboratory and distributed among various poultry raisers. All have reported good results with its use. A new vaccine for this disease is now in the course of preparation, which, if proven to be effective, will enable us to keep on hand large amounts of this biologic to supply any emergency. Nothing definite can be reported on it as yet, as it is still in the experimental stage.

## NEW REGULATIONS.

The new importation regulations have been printed and distributed throughout the Territory and the mainland of the United States. These regulations have been further strengthened and supported by a printed "Shipmaster's Notice" and a "Shipmaster's Bond," copies of which are herewith appended. These are already getting good results.

Revised regulations governing the care and treatment of dogs while in quarantine and setting aside certain hours of each day when owners and visitors will be allowed access to the dog quarantine enclosure have been posted at the station. Certain hours for visitors are necessary in order to give the caretaker an opportunity to care for the dogs and clean kennels and grounds without interruptions, and also give the veterinarian in charge a chance to administer the anti-rabies or other treatment at a time when the dogs are not excited by the presence of strangers.

## MAUI.

Dr. Fitzgerald reports an outbreak of hemorrhagic septicemia in herds on the lower Kula plains. Fifteen deaths occurred before vaccination. A total of 779 head of cattle were vaccinated, with only two deaths occurring subsequent.

In tuberculosis control work 186 head of cattle were tested, with one reactor.

Among miscellaneous infections a few cases of equine influenza and bovine keratitis have occurred during the month.

## HAWAII.

From West Hawaii, Dr. Rowat reports a case of glanders on one of the plantations. This is the second case in a little over a year. A thorough canvass of this entire district should be made in the near future in order to eradicate the last stronghold of glanders in this Territory.

The tuberculosis work was confined to slaughter-house inspection.

The hemorrhagic septicemia situation in this district has cleared up entirely, and Dr. Rowat feels that, for the present, this disease is under control.

From East Hawaii, Dr. Elliott reports as follows:

## Port Inspection:

S. S. ENTERPRISE, San Francisco.

3 horses .....	R. A. Hutchinson
7 crates poultry .....	Various

## TUBERCULOSIS CONTROL.

During the past month 156 head of dairy cattle in 66 dairies were submitted to the tuberculin test, out of which number 153 passed and 3 were condemned and branded.

Besides the above testing, 8 head of condemned cattle were slaughtered and autopsies performed, lesions of tuberculosis being found in each case.

## KAUAI.

From Kauai, Dr. Golding reports the testing of 85 head of cattle, with two reactors. Autopsies were made on 4 head of condemned cattle, lesions of tuberculosis being found in each case.

No outbreaks of infectious disease occurred during the month.

Respectfully submitted,

LEONARD N. CASE,  
Territorial Veterinarian.

**REPORT OF ASSISTANT TERRITORIAL VETERINARIAN,  
AUGUST, 1921.**

Honolulu, Hawaii, September 9, 1921.

Dr. Leonard N. Case,  
Territorial Veterinarian,  
Board of Agriculture and Forestry,  
Honolulu, T. H.

Dear Sir:

I beg to submit herewith the following monthly report for August, 1921:

**TUBERCULOSIS CONTROL.**

During the month of August, 68 head of cattle, belonging to 10 different owners, were tested for tuberculosis and 4 reactors discovered.

The 4 reactors were found in an importation of 32 head of California cattle retested at the Quarantine Station and the property of the Murphy Horse and Mule Company.

Five head of tuberculous cattle were autopsied at time of slaughter and tuberculous lesions found in each.

**RABIES AND CANINE DISTEMPER CONTROL.**

Four dogs were given the anti-rabies vaccine and one dog canine distemper vaccine.

**SEPTICEMIA HEMORRHAGICA.**

During the month an outbreak of hemorrhagic septicemia occurred in dairy cattle located mostly in the Kapahulu district.

About 16 head died during the outbreak, 10 of which were in one dairy.

A number of sick animals were treated with hemorrhagic septicemia serum, all making recoveries.

The cattle in all dairies in this district were given the prophylactic treatment with the specific vaccine. In all 461 head received vaccine.

In some instances second treatment was necessary.

**LIVE STOCK IMPORTATIONS.**

Of the 29 vessels inspected by me, 10 brought live stock to this port, as follows:

Cattle, 18; dogs, 5; cats, 1; poultry, 174 crates.

Respectfully submitted,

L. E. CASE,  
Assistant Territorial Veterinarian.









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# THE HAWAIIAN FORESTER AND AGRICULTURIST

NOVEMBER, 1921

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Entomology, Animal Industry  
and Agriculture

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## BIRD INTRODUCTIONS.

By C. S. JUDD, *Executive Officer.*

The hornfly is a distressing pest in Hawaii and the worry and irritation from its blood sucking habit has been felt by thousands of cattle in these islands since its introduction twenty-four years ago.

Entomologists have been working on the control of this pest and have attacked it mainly by introducing tumble bugs in the attempt to break up manure which is the breeding place of the larvae of the hornfly.

In the effort to give more relief to cattle raisers throughout the Territory the Board of Agriculture and Forestry is now considering the proposition of introducing from Australia a bird which will destroy the adult fly.

The bird which has been highly recommended is a fly catcher called the Shepherd's Companion (*Rhipidura tricolor*). It is also known in Australia as Willie Wagtail because it spreads its tail out fan-like and wags it from side to side. The bird has a wide range of distribution from Australia through the Malay Islands to the mainland of Asia.

The Willie Wagtail is considered to be wholly insectivorous and for this reason there is no danger of its becoming a menace to rice or other agricultural crops in these islands. In its native habitat in Australia it is very seldom ever found in the thick forest country or in the middle of cane fields, but is often found around the edges by the roadside especially if horses and cattle are about. There is little doubt that it would be of benefit in these islands for it feeds on flies of various sorts, grasshoppers and nearly any insect that is moving about. For this reason, it would also take beneficial insects as well as harmful ones, but the few beneficial flies that it would capture would be offset by the leafhoppers, moths and other cane enemies which it would consume, thereby squaring accounts.

The Willie Wagtail is a small bird with a black back and tail and a white belly and its attractive cry resembles, "Sweet pretty creature." The bird is universally loved throughout Australia because of its friendly habits and it is regarded there as almost part of the home and one would no more interfere with the Willie Wagtail than destroy the domestic chickens, its daily companions. So tame does this bird become, if unmolested about country houses, that it will feed out of its protector's hands. It makes its nest in trees and would therefore, not be interfered with by the mongoose.

It may often be seen dancing upon the backs of horses, cattle, or sheep grazing in open paddocks, or hopping along in the grass before them. It is either searching for parasites upon the ani-



Part of Forestry Exhibit, Fourth Maui County Fair





mals or catching the insects disturbed by them while feeding, principally flies, small moths, and beetles. Like all the fly-catchers, this bird has the habit of watching the insects flying around it while perched on a limb of a tree, or top of a post or fence. Suddenly it darts into the air, and with a vicious little snap secures its prey, returning again to the same place to pull it to pieces and eat it. It has also been seen to feast on ticks infesting cattle.

Another bird the introduction of which the Board has already approved, is the Meadow Lark (*Sturnella neglecta*). This is an almost wholly beneficial bird with a cheerful whistle and feeds almost entirely on animal food, practically all insects. The insects are ground species, such as beetles, bugs, grasshoppers and caterpillars, with a few flies, wasps and spiders. It is especially fond of crickets and grasshoppers, beetles, and caterpillars. Professor Henshaw in 1907 stated that the meadow lark may be introduced into these islands with absolute safety and that it would render good service in feeding on dung insects. The chief drawback would be that since the meadow lark invariably breeds on the ground, it would be subject to attack by the mongoose. A recent communication from the Fish and Game Commission of California states the difficulty of capturing meadow larks for shipment. This bird does not flock in the same way that other species do, and it is practically impossible to trap them in any number. The meadow lark would be a distinct addition to our present meager list of sweet-singing birds.

A bird that has already become a delight in these islands to admirers of the feathered tribe is the Chinese Flycatcher or Huamei (*Trochaloxyton canorum*). This is also erroneously called the Chinese thrush. This is a modest small brown bird which may seldom be seen hopping among the bushes but whose clear notes furnish charming entertainment to those who have been fortunate enough to hear it. There is no positive record of its introduction and establishment in these islands, but being a favorite with the Chinese as a cage bird, it was originally introduced as such, and is supposed to have become established soon after 1900 when the fire in Chinatown caused their liberation from cages. The Chinese flycatcher is insectivorous and so far no complaints against it have been made by agriculturists in these islands. It is now well distributed on the islands of Oahu and Kauai.

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## THE FOURTH MAUI COUNTY FAIR.

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By C. S. JUDD, *Executive Officer*.

The Board of Agriculture and Forestry participated in the Fourth Maui County Fair, which was held at the Maui fair

grounds in Kahului, on October 13 to 15, 1921, by a display representing the activities of each of its four divisions.

The Division of Forestry had the largest exhibit which consisted of a fine assortment of more than fifty species of trees, raised by Ranger James Lindsay at the Board's nursery in Haiku, and arranged tastefully on a large pyramidal table; the working rainfall-erosion model which once again demonstrated most forcibly and practically the beneficial controlling influence of a forest cover upon the runoff; and a diagrammatic poster explaining just how trees grow. Among the innovations this year were a very complete collection of tree seeds arranged in vials by the Forest Nurseryman, a set of thirty photographic enlargements with explanatory captions illustrative of forest work in Hawaii, a collection of plain and polished boards of the more important native and introduced woods cut from trees grown in Hawaii, and a novel collection of fresh boughs of pines, spruce, and cedar brought down from trees now growing in the experimental plot at 7,000 feet elevation on the slopes of Haleakala.

Small sample blocks of the real sandalwood, a variety of seeds, and farmers' bulletins and agricultural year books were given out from the exhibit stand.

The Division of Entomology was represented by a collection of cases of the insect pests of the Territory with specimens of the beneficial insects which have been introduced to prey upon them. Some of the latter were also exhibited in living form.

The Division of Plant Inspection display included insect and pathological specimens from other countries taken during the inspection of imported fruit and plant material and, as well, specimens and descriptions of some of the serious pests which have never appeared here and which this division seeks to keep out by rules and regulations and by the careful inspection of all importations which may harbor them.

The Division of Animal Industry exhibited charts showing progress in the control and suppression of infectious and contagious animal diseases in the Territory and pathological specimens representing lesions developed by bovine tuberculosis.

The displays were more extensive than at previous fairs, were highly attractive to the visiting crowds and produced very favorable comment. A special prize of a pink ribbon was awarded to the exhibit as a whole.

Lessons learned from this fair show the necessity of preparing beforehand a ground floor plan of table and stand arrangements and of carefully labelling all exhibits so that the orthography will be correct and the labels legible.



**Part of Entomological and Forestry Exhibits  
Fourth Maui County Fair**





## DIVISION OF FORESTRY.

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### REPORT OF SUPERINTENDENT OF FORESTRY, SEPTEMBER, 1921.

Honolulu, October 24, 1921.

Board of Commissioners of Agriculture and Forestry,  
Honolulu, H. T.

Gentlemen:

I respectfully submit the following report of the Division of Forestry for the month of September, 1921:

#### FOREST PLANTING.

Owing to dry weather conditions during the month it was found advisable to continue tree planting operations in only two places and these resulted in the setting out of a total of 678 trees. At 18 Miles on the Volcano Road, Hawaii, where Ranger Mackenzie has been fencing some of the portions of Sec. C. of the Olaa Forest Park Reserve, he planted 4 Norfolk Island pines as boundary markers, 6 silk oak, and 129 lemon gum trees. In the Waiahole Forest Reserve, Oahu, the planting crew set out 200 Australian red cedar, 66 alspice, 10 alligator pear, 50 Benguet pine, 25 black myrobalan (*Terminalia chebula*), 128 African tulip, 25 Moreton Bay fig and 35 uhiuhi (*Mezoneurum Kawaiiense*). The latter is the indigenous tree from which tapa beaters were fashioned. It is somewhat rare and only a few good specimens are to be found in the native forests.

Weather conditions were too dry for planting at Mikilua in the Lualualei Forest Reserve, but an inspection made by me on September 29, showed that there were 5000 transplant trees on hand in the nursery and as many holes dug in the field, all ready for planting out as soon as sufficient rains make the soil moist enough for successful planting. The Makiki tree planters were engaged during the month in clearing ground for the arboretum in lower Makiki Valley.

On September 29 and two days, after, I secured a quantity of seed of the Australian red cedar from mature trees at Wahiawa, Oahu. This tree is now much in demand and this is the only local supply of seed to be found at present in the Territory.

#### FOREST FENCING.

In addition to minor repairs being made to fences on various forest reserve boundaries by the rangers, a new fence begun by Ranger Mackenzie and three men on August 24 was completed on September 13, around portions of Sec. C. of the Olaa Forest Park Reserve on both sides of the Volcano Road at 18 Miles, Olaa, Hawaii. The total length of this fence is .56 miles and the object of constructing it is to protect the remaining native forest from damage by stock and to allow it to grow up, supplementing by artificial planting.

Notification has been received from the Commissioner of Public Lands that the forest reserve fence across the land of Ukumehame

on West Maui required by General Lease 587 has been entirely rebuilt with new posts and wire and is now in a stockproof condition and that the forest reserve fence on the boundary of the Kau Forest Reserve on Hawaii, across the land of Kiolakaa, required to be maintained by General Lease 550, and found by me on August 26 to be in bad shape, has been repaired and put in stockproof condition.

Construction of about one mile of new fence on the boundary of the Waiahole Forest Reserve, Oahu, began on September 12. This involves the erection of a water gate across the stream and a gate across the road and when completed will close up a gap on the boundary and give absolute protection from stock to all of the native forest in Waianole Valley and to the new chaulmoogra oil tree plantation which will soon be planted out there.

The Commissioner of Public Lands is considering the issuance of a new license which will include clauses which should result in the construction of a new American wire fence on the boundary of the Kula Forest Reserve, Maui, in the region of Polipoli Spring.

#### HILO FOREST RESERVE.

The work done on the boundary survey of this reserve consisted of running the forest line across the government land of Piihonua and the land line between Piihonua and Punahoa 2nd.

#### MANGROVE TREES ON OAHU.

On September 9, I found seven young mangrove trees (*Rhizophora Mangle*) 18 inches high growing on a tidal beach at the mouth of Waikane Stream, in Koolaupoko, Oahu, as well as many young plants which had been washed up on the shore by the ocean waves. Young plants of this tree are also reported to have been found on the windward coast of Oahu from Waiahole to Laie. As the only known mature trees of the kind which could have produced these young plants are found at Palaaui, Molokai, where they were introduced from Florida in 1902, it is probable that the young trees at Waikane were carried by ocean currents for a distance of at least 60 miles.

#### RECLAIMING GRASSLAND.

On September 16, I made the first examination of the experiment in Nuuanu Valley initiated six months previously to determine whether Hilo grass areas may be overcome by the broadcast sowing of seed of the haole koa (*Leucaena glauca*). No seedlings could be found in the heavy Hilo grass plots which were untreated, but on the three plots on which the grass was burned the broadcast sowing amounted to 10, 10, and 12% success, and on the three plots on which the grass was burned and the ground dug up the success of sowing amounted respectively to 13, 14, and 10%.

Respectfully submitted,

C. S. JUDD,  
Superintendent of Forestry.

**REPORT OF ASSISTANT SUPERINTENDENT OF FORESTRY,  
SEPTEMBER, 1921.**

October 28, 1921.

Superintendent of Forestry,  
Honolulu, H. T.

Dear Sir:

I respectfully submit the following report of my work during September, 1921:

**BOUNDARY SURVEY.**

The first half of the month was spent on the Island of Hawaii on matters relating to the survey of the Hilo Forest Reserve boundary. Surveyor Hoekley, having completed the north end of the boundary, returned to Hilo and located the final line across Piihonua as agreed upon in the field on August 11 by the Superintendent of Forestry and the Commissioner of Public Lands. The line as now established, leaves between the forest reserve and the existing cane fields a belt of grass land containing approximately 200 acres which is being used at present as cattle range, but which is physically capable of growing cane. Upon completion of the Piihonua line Mr. Hoekley was directed by the Survey Department to begin other work for which there was urgent need in preparing a new lease of the Piihonua cane lands. In consequence of this order the boundary survey will suffer a delay of a month or six weeks.

In company with Mr. Bryan, I spent several days exploring portions of the makai boundary which had not been previously inspected. At Opea-Peleau I secured the cooperation of a homesteader in planting trees along the Reserve boundary. In return for several boxes of trees furnished him for his own use, this man planted one-third of the trees in a specified area inside the Forest Reserve. Neighboring homesteaders have since purchased trees from the Hilo Government Nursery for the planting of woodlots on their own lands. For boundary planting the lemon-scented gum (*Eucalyptus citriodora*) has been chosen because of its conspicuous bark and its tall and upright habit of growth.

**AKAKA FALLS.**

At Kolekole Stream the boundary survey had not been carried beyond the homestead corners on each side. Inasmuch as this gulch is government land I planted pipes arbitrarily some distance below Akaka Falls in order to include this scenic and historic spot within the Reserve. Some further work will be required to mark the boundaries of a small area in the gulch from which visitors may view the falls to advantage. Since this remarkable waterfall is one of the few places within the forest reserves which the public can enjoy without damage to the forest, it seems incumbent upon the Division of Forestry to make the most of its recreational possibilities. With very little work by the Hilo Reserve Ranger an attractive picnic ground can be developed below the falls and a short trail be built to make the spot accessible.

## MISCELLANEOUS.

Before leaving Hawaii I collected a quantity of seed of the Kopiko (*Straussia hillebrandii*) which was fruiting abundantly along the Volcano Highway at six miles. I also shipped to the central nursery at Honolulu twenty-five bags of tree moss which was collected by a homesteader's family in Kaiwiki.

On September 18th I returned to Honolulu on the Matsonia, and the remainder of the month was given largely to the preparation of a forestry exhibit for the Maui County Fair to be held October 13, 14, 15.

Two days, however, were spent with the Superintendent of Forestry at Waiahole where a swinging water gate was constructed in the forest boundary fence across Waiahole Stream.

## AIRPLANE SURVEY CONFERENCE.

On September 28 a conference was held in the office of Major Curry, Air Service, at Fort Shafter, to discuss the use of airplane photographs in various scientific and engineering activities of other government departments. The conference included, besides Major Curry, A. O. Burkland, Chief of the U. S. Geological Survey in Hawaii, Representative G. P. Wilder of the Territorial Legislature, the Superintendent of Forestry and myself. The discussion revealed that mosaic photographs would be of great value to the Geological Survey in mapping difficult areas; to the Bishop Museum in numerous researches and particularly in delineating the glaciation of Mauna Kea; and to the Division of Forestry in surveying reserve boundaries, in studying the interior condition of important reserves and the gradual recession of their edges, in developing working plans for the planting of bare areas within these reserves, in selecting the location of protection fences, in deciding the limits of new forest reserves and in making changes in existing boundaries. In fact, from the standpoint of forestry alone, whatever expense would result to the Government in securing such airplane photographs would be more than justified by the uses which they would serve. Major Curry felt confident that it was entirely feasible to secure the desired photographs and that the work would be welcomed with interest by the fliers. Further arrangements will have to be made, however, in securing official authorization and in getting adequate supplies of motor fuel before any work can be undertaken. The effort will then be made to combine this photographic work with the regular program of Air Service activities on the various islands. Instead of being done as a separate project it will be accomplished gradually as opportunity offers. The results of this preliminary conference were highly encouraging since it appears certain that the cooperation of the Air Service will be forthcoming.

Respectfully submitted,

CHAS. J. KRAEBEL,  
Asst. Superintendent of Forestry.



**REPORT OF FOREST NURSERYMAN, SEPTEMBER, 1921.**

October 20, 1921.

Superintendent of Forestry,  
Honolulu, H. T.

Dear Sir:

I herewith submit a report of the work during the month of September:

**NURSERY—DISTRIBUTION OF PLANTS.**

The number of plants distributed, including those sent to forest reserves, are as follows:

	In Transplant Boxes.	Pot Grown.	Total
<b>Oahu.</b>			
Sold . . . . .	....	827	827
Gratis . . . . .	100	1089	1189
	<u>100</u>	<u>1916</u>	<u>2016</u>

**SUB-NURSERIES.**

	Seed Boxes.	Transplant Boxes.	Pot Grown.	Total.
<b>Maui and Molokai.</b>	....	220	....	220
<b>Kauai . . . . .</b>	2,000	....	....	2,000
<b>Hawaii . . . . .</b>	<u>7,000</u>	<u>5,833</u>	<u>928</u>	<u>13,761</u>
				<u>15,981</u>
Total for all Islands.....				17,997

**COLLECTIONS—GOVERNMENT REALIZATIONS.**

Sale of plants, Government Nursery, Honolulu.....	\$ 9.95
Sale of plants at Kalaheo Nursery, Kauai.....	11.00
Hilo Nursery .....	10.13
Rent of Office Nursery Grounds, for August.....	35.00
	<u>\$66.08</u>

**PRESERVATION FOREST RESERVES.**

Rent of premises at halfway house, Tantalus, for quarter ending November 30, 1921 .....	\$30.00
--	---------

**BLACK SAND.**

34 loads of black sand taken from Makiki Valley Sand pit at \$50 per load .....	17.00
Permit to S. O. Kuba to cut grass in Nuuanu Valley below Lua- kaha to December 31, 1921.....	1.00
	<u>\$48.00</u>

## ANIMAL INDUSTRY REVOLVING FUND.

Sale of Vaccine, etc.....\$27.05

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## MAKIKI STATION.

The work done at Makiki Station consisted of the regular routine, namely, mixing and sterilizing soil, transplanting seedlings, making boxes, etc.

## HONOLULU WATERSHED.

The five men employed on the watershed have been working at the bottom of Makiki Valley clearing off the brush and making ready for commencing the planting on the Arboretum proposition. The start was made at the sand pit and the clearing is being done on Ewa side of the Valley, the clearing of the other side will be started soon.

## ADVICE AND ASSISTANCE.

The writer has made the following number of visits and otherwise given advice and assistance at the request of people in and around the city:

Calls made .....	6
Advice given by telephone.....	8
Advice given people calling.....	10
	<hr/>
	24

Respectfully submitted,

DAVID HAUGHS,  
Forest Nurseryman.

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 DIVISION OF ENTOMOLOGY.

## REPORT OF ENTOMOLOGIST, SEPTEMBER, 1921.

Honolulu, October 19, 1921.

Board of Commissioners of Agriculture and Forestry,  
Honolulu, T. H.

Gentlemen:

During the month of September the insectary handled 9,000 pupae of the melon fly, from which there were bred 1,415 females and 1,679 males, *Opus fletcheri*.

## MELON FLY PARASITES.

*Opus fletcheri*.

	Females.	Males.
OAHU:		
Kalakaua Avenue .....	600	600
Moanalua Cucumber Field .....	650	700

## FRUIT FLY PARASITES.

*Galesus silvestri.*

Males and Females.

OAHU:

Mrs. Spencer, Nuuanu Avenue..... 900

*Dirhinus giffardi.*

OAHU:

Mrs. Spencer, Nuuanu Avenue..... 700

*Diachasma tryoni.*

Females. Males.

OAHU:

Mr. M. Kawahara, Kalihi..... 350 300

MAUI:

Rev. V. Jones, Paia..... 50 50

*Diachasma fullawayi.*

OAHU:

Mr. M. Kawahara, Kalihi..... 400 300

Mrs. Campbell, Beretania Street..... 100 100

MAUI:

Rev. V. Jones, Paia..... 50 50

*Tetrastichus giffardianus.*

OAHU:

Mr. M. Kawahara, Kalihi..... 1,700 ...

Mrs. Campbell, Beretania Street..... 500 ...

*Opius humilis.*

OAHU:

Mrs. Campbell, Beretania Street..... 100 50

Mr. M. Kawahara..... 50 50

The Entomologist was employed during the month in attending to the direction of field work abroad, particularly in getting Mr. Osborn started in S. W. United States.

On the 13th instant, Mr. Illingworth returned from Australia bringing a number of dung fly predators, some of which were liberated and others kept for rearing. A large Staphylinid (*Creophilus erythrocephala*) has been multiplied in confinement and over 900 liberated, 600 at the Waialae Ranch near Honolulu and 300 on the Parker Ranch at Wahineke, where 50 tumble bugs (*Oonthophagus pugnax*) were also planted.

Respectfully submitted,

D. T. FULLAWAY,  
Entomologist.

## DIVISION OF PLANT INSPECTION.

### REPORT OF CHIEF PLANT INSPECTOR, SEPTEMBER, 1921.

Honolulu, September 30, 1921.

Board of Commissioners of Agriculture and Forestry,  
Honolulu, Hawaii.

Gentlemen:

I herewith submit my report of the work carried on by the Division of Plant Inspection for the month of September, 1921, as follows:

During the month 39 vessels arrived at the Port of Honolulu, 23 of which carried vegetable matter and 3 came by way of the Canal. The following disposal was made of the various shipments:

Passed as free from pests.....	1839 lots	39,771 pkgs.
Fumigated . . . . .	7 "	7 "
Burned . . . . .	46 "	50 "
Returned . . . . .	3 "	249 "
<hr/>		<hr/>
Total inspected.....	1895 lots	40,077 pkgs.

Of these shipments 39,834 packages arrived as freight, 150 as baggage and 93 as mail.

### RICE AND BEAN SHIPMENTS.

During the month 9,210 bags of rice and 956 bags of beans from the U. S., and 6,093 bags of rice and 1,332 bags of beans from Japan arrived. All were passed as free from pests.

### PESTS INTERCEPTED.

Approximately 3,078 pieces of baggage belonging to immigrants from foreign countries were examined from which 21 lots of fruit and 14 lots of vegetables were seized and destroyed. A tabulated list of material intercepted other than the above mentioned fruits and vegetables follows:

#### CALIFORNIA:

Sept. 6—92 bx. peaches, cargo, returned, peach moth.

Sept. 6—155 sx. potatoes, cargo, returned, eel worm.

Sept. 24—1 lot pears, baggage, burned, *Pseudococcus* sp.

Sept. 27—1 pkg. Mountain Ash berries and twigs, baggage, burned, infested with moth larvae, beetle grubs and fungus.

#### CHINA:

Sept. 4—1 pkg. oil nuts, mail, fumigated precautionary.

Sept. 17—1 pkg. birdseed, baggage, fumigated, lepidopterous larvae.

#### INDIA:

Sept. 17—1 pkg. seed, mail, to Dr. Lyon, fumigated precautionary.

#### JAPAN:

Sept. 4—1 pot plant, baggage, returned, prohibited.

Sept. 4—1 pkg. pohas, mail, burned, prohibited.

Sept. 19—1 lot sandpears, baggage, burned, *Lepidosaphes ficus*.

Sept. 19—1 pkg. paddy rice, baggage, burned, prohibited.

#### PHILIPPINES:

Sept. 2—1 pkg. seed, baggage, burned, prohibited.

Sept. 4—1 pkg. coffee seed, baggage, burned, prohibited.

Sept. 4—2 pks. tree seeds, mail, Lyon from Williams, CS<sub>2</sub> pre-



cautionary.

- Sept. 4—1 pkg. Mango seed, mail, burned, prohibited.  
 Sept. 10—5 Pomelo, baggage, burned, *Parlatoria zizyphus*.  
 Sept. 17—1 Pomelo, baggage, burned, *Chrysomphalus aurantii*.  
 Sept. 17—1 orange, baggage, burned, pupae of lepidoptera.  
 Sept. 17—1 pkg. lemon, mail, burned, prohibited.

### BENEFICIAL INSECTS.

The following beneficial insects were received from Australia during the month:

Sept. 13—1 bskt. grubs of Staphilinid and Sylphid beetles. Also pupae of Diptera with parasites for Horn Fly control. Brought by Illingworth.

Sept. 24—A basket from Pemberton, Sydney, containing:

- 1 pkg. figs with *Pleistodontes* sp.  
 1 pkg. leaf hopper parasites (Red Spider).  
 1 pkg. leaf hopper parasites (*Cyrtorhium* eggs).  
 1 pkg. wireworm parasites (Predatory mite).

These were all handled at the H. S. P. A. by me in the same manner as past shipments.

### HILO INSPECTION.

Brother Newell, Inspector at Hilo, reports the arrival of 7 steamers with 5 carrying vegetable matter consisting of 252 lots and 4591 parcels. 1 case of peaches from California, badly rotted, and a package of sandpears from Japan were destroyed.

### KAHULUI INSPECTION.

Mr. Louis Gillin, Inspector at Kahului, reports the arrival of 5 vessels with 2 carrying vegetable matter. 14 lots and 1309 parcels were passed, all free from pests.

### INTER-ISLAND INSPECTION.

53 steamers plying between Honolulu and other island ports were attended and the following inspections made:

#### PASSED.

Taro . . . . .	135 bags.
Vegetables . . . . .	89 pkgs.
Fruit . . . . .	185 pkgs.
Plants . . . . .	105 pkgs.
Pine Shoots . . . . .	211 bags.
Sugar Cane . . . . .	60 cases.
Seeds . . . . .	22 pkgs.

---

807 pkgs.

#### REJECTED.

Plants . . . . .	14 pkgs.
Fruit . . . . .	1 pkgs.
Sugar Cane . . . . .	2 pkgs.
	<hr/>
	17 pkgs.

Respectfully submitted,

E. M. EHRHORN,  
 Chief Plant Inspector.

## DIVISION OF ANIMAL INDUSTRY.

### REPORT OF TERRITORIAL VETERINARIAN, SEPTEMBER, 1921.

October 26, 1921.

Board of Commissioners of Agriculture and Forestry,  
Honolulu, T. H.

Gentlemen:

I beg to submit the following report for the month of September, 1921:

#### TUBERCULOSIS CONTROL.

During the past month 337 head of dairy cattle in seventeen dairies were tested with the result that 12 head were condemned. These condemned cattle were removed from the dairies immediately and placed in quarantine until disposed of.

In the work of tuberculosis eradication a new method of procedure has been adopted in that each and every milk producer must obtain a tuberculin test certificate from this office showing that his cattle have been tested and that he has cleaned and disinfected his premises. Through cooperation with the City and County Milk Inspector no permit to sell milk will be issued to a producer until he has first obtained the above mentioned test certificates.

Heretofore cleaning and disinfection after a tuberculin test has been carried on in a very unsatisfactory manner and such cleaning and disinfection is half the battle in the eradication of such a disease as tuberculosis.

Now, through the hearty support and cooperation of the City and County through its milk inspector we can compel every milk producer to carry out this very necessary work after reacting animals have been removed from his dairy.

#### CONTAGIOUS EPITHOLOMA OR SORE-HEAD IN POULTRY.

During the past month about 10,000 cc. of sore-head vaccine and bacterin were made up in the laboratory according to the new process. A certain amount of this product was sent to Mr. Harold Fisher of Olaa, Hawaii, who kindly consented to carry out a series of experiments to prove its value. His reports on the initial experiments are very satisfactory indeed, complete recoveries taking place in every instance. This would seem to indicate that this product has a very decided value in the cure of this very contagious disease of poultry. However, further experiments must be conducted in order to definitely establish its value.

#### HAWAII.

Dr. Elliot reports as follows:

Port Inspection:—S. S. Enterprise, San Francisco, 2 cts. poultry.

#### TUBERCULOSIS CONTROL.

During the past month Dr. Elliot tested a total of 139 head of cattle located in 30 dairies condemning a total of 6 head.

No outbreaks of infectious disease were encountered.

Dr. A. R. Rowat reports an outbreak of spinal meningitis in mules at Puako which was completely checked with no loss by the use of Botulinus Anti-toxin.

No other outbreaks of infectious disease were reported from his district.

## MAUI.

Dr. J. C. Fitzgerald reports two outbreaks of hemorrhagic septicemia in the Kula District. The loss was kept down to five head through vaccination.

## TUBERCULOSIS CONTROL.

A total of 16 head of cattle were tested during the month with no reactors.

## KAUAI—TUBERCULOSIS CONTROL.

136 head of cattle were tested with two reactors.

## ANTHRAX CONTROL.

13 head of horses on the Hanalei Ranch were given the serum-simultaneous treatment.

A few isolated cases of hemorrhagic septicemia and equine influenza were reported during the month.

Respectfully submitted,

LEONARD N. CASE,  
Territorial Veterinarian.

**REPORT OF THE ASSISTANT TERRITORIAL VETERINARIAN,  
SEPTEMBER, 1921.**

October 26, 1921.

Dr. Leonard N. Case,  
Territorial Veterinarian,  
Board of Agriculture and Forestry,  
Honolulu, H. T.

Sir:

I beg to submit the following report of work done during the month of September, 1921:

## TUBERCULOSIS CONTROL.

During the month of September, 337 head of dairy cattle were tested, of which 12 head reacted and were destroyed.

Instructions were given the dairy owners to thoroughly clean and disinfect their dairy barns, and grounds.

## RABIES TREATMENT.

During the month eight dogs were given the anti-rabies treatment at the quarantine station.

## LIVE STOCK IMPORTATIONS.

Of the seventeen steamers examined by me, ten brought the following live stock to this port:

Dogs . . . . .	3	Pigs . . . . .	1 ct.
Cats . . . . .	1	Monkeys . . . . .	1
Bulls . . . . .	1	Poultry . . . . .	258 cts.
Cows . . . . .	1		

Respectfully submitted,

L. E. CASE,  
Assistant Territorial Veterinarian.





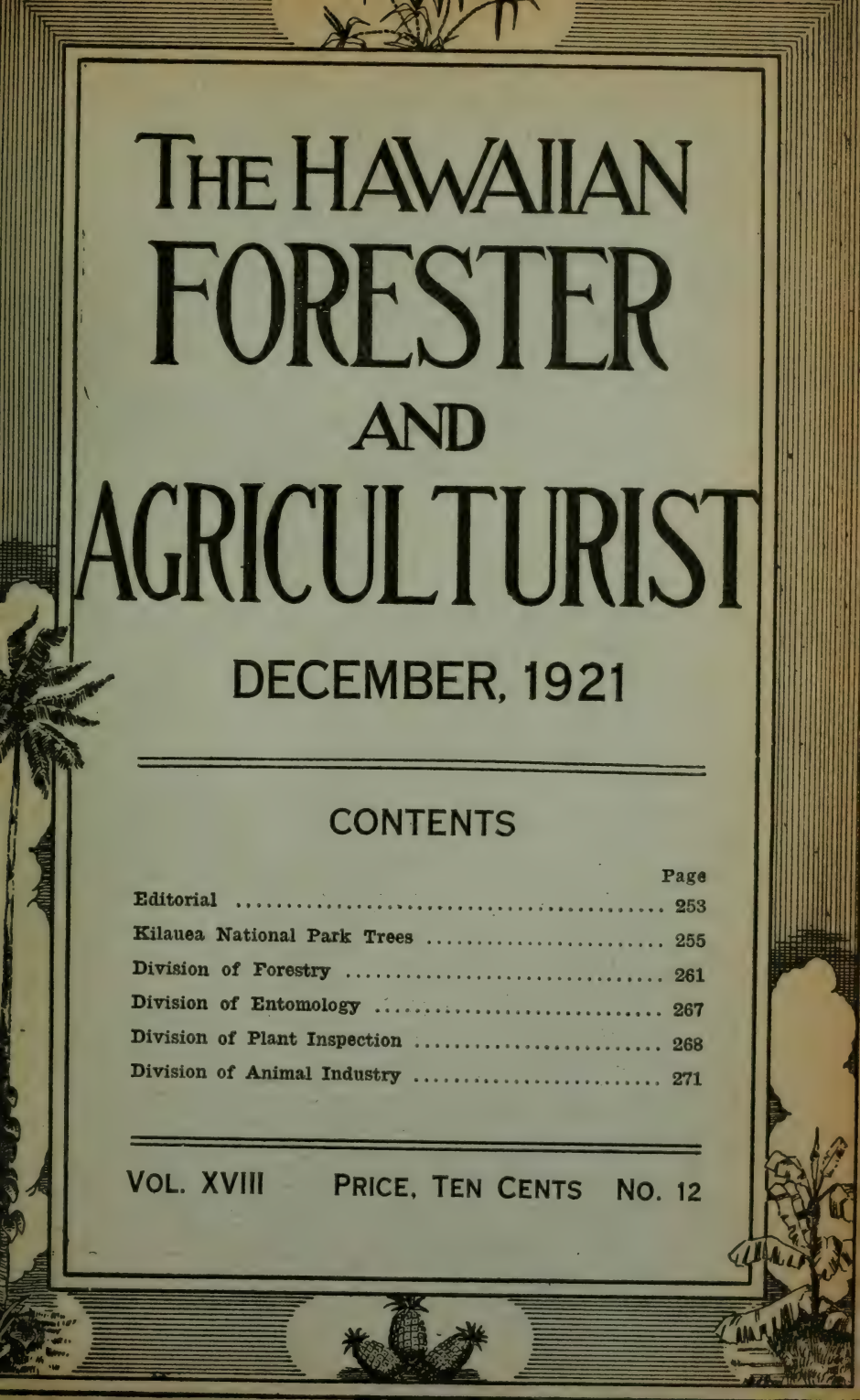












# THE HAWAIIAN FORESTER AND AGRICULTURIST

DECEMBER, 1921

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(1921)

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Ohia lehua (left) and koa trees in Kipuka Puau,  
Hawaii National Park.

# THE HAWAIIAN FORESTER AND AGRICULTURIST

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VOL. XVIII.

HONOLULU, DECEMBER, 1921.

NO. 12

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The Division of Forestry during October planted out 8,796 trees on two different forest reserves on Oahu and Kauai.

Hemorrhagic septicemia caused some losses among cattle and hogs on several of the islands during the month of October.

The makai boundary of the Mokuleia Forest Reserve on the Island of Oahu has recently been flagged preliminary to fencing on a co-operative basis with the owners of adjacent lands.

A total of 2.69 miles of fencing on forest reserve boundaries to prevent the ravages of stock in the native forest received attention on several of the islands during October.

Mr. Lawrence L. Peralto of Hilo, recently appointed Forest Ranger by the Board, began his duties on October 1, 1921, in connection with work on the Hilo Forest Reserve.

Two more consignments of tumble-bugs, which are an aid in the control of the horn fly by breaking up manure, were received from our Field Entomologist in California during October.

During the month 41,545 tree seedlings were distributed throughout the Territory from the four main tree nurseries of the Board.

Entomologist Fullaway has just announced that he has recovered in Honolulu *Dirhinus giffardi*, showing that this parasite on the fruit fly is now established.

The Assistant Superintendent of Forestry has been assigned the task of finding a source of dependable seed of the upright Italian cypress which will reproduce seedlings true to the parent form.

The establishment of the chaulmoegra oil producing plantation at Waiahole, Oahu, was begun during the month by sending over the first lot of plants from the Government Nursery in Honolulu.

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The operation of the regulations under Notice of Quarantine No. 51 of the Federal Horticultural Board giving Hawaii protection against certain insect pests on the mainland began on October 17, 1921, when a supply of the Baggage Declaration Form 286 was received from Washington, D. C.

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The possibility of growing temperate zone coniferous trees at the higher elevations in these islands has been proved by the success obtained in the planting of Coulter, white, and other pines, incense cedar, and other conifers at 7,000 feet on Haleakala, Maui. Some of these have attained a height of 17 feet in eleven years and are already bearing cones.

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The assistance rendered the Plant Inspectors of this Board by the U. S. Public Health Service and the Collector of Customs in furnishing launch transportation to and from incoming vessels while off port is very much appreciated by this Board.

---

The project of introducing the wasp which fertilizes the fruit of the India rubber tree (*Ficus elastica*) met with failure. The long journey from India was too much for the plants and the fruit which had all dropped off from the withered stems exhibited the exit holes through which the wasps had emerged.





Manele or Soap-berry tree in Kipuka Puauulu, Hawaii National Park.



## KILAUEA NATIONAL PARK TREES

By C. S. JUDD, *Superintendent of Forestry.*

The Hawaii National Park consists of four sections located on two different islands. The Haleakala Section, comprising 21,150 acres, is on the island of Maui and includes the largest extinct volcano in the world. The summit of this mountain mass is 10,000 feet above sea level and the crater is seven and one-half miles across and 2,000 feet deep. The floor of the crater is covered with numerous cinder cones, some of which are 700 feet high. The scenic views from the rim of this crater are truly wonderful, especially at sunset and dawn.

The other three sections of this National Park are all on Hawaii, the largest island of the group.

At the summit of Mauna Loa, or "Long Mountain," which reaches a height of 13,675 feet, and where snow is perpetual, the park embraces 17,020 acres of lava flow wilderness. Within this area is the crater of Mokuaweoweo, which is almost four miles across, and which occasionally is in active eruption.

Connecting this section and the last and most interesting, there is provision for 360 acres, consisting of a right of way for a road to be definitely located at a later date.

The last section includes 35,865 acres of land around the accessible and famous active volcano of Kilauea, to which it is planned soon to add approximately 43,400 acres of the great Kau desert. When this is accomplished and roads have been developed, it will be possible in the morning to snowshoe or ski in perpetual snow 13,000 feet above the sea and in the afternoon to bathe in the warm waters of the Pacific Ocean or bask on the sunlit sands at the beach. Between these two extremities various temperatures and climates may be enjoyed and all of this is on one National Park.

The general elevation at Kilauea is a little under 4,000 feet and the crater is three miles across. In one part of the floor of this crater is Halemaumau, the lake of active lava, to almost the very brink of which one may travel in an automobile.

While the Hawaii National Park will always be chiefly noted for its volcanic attractions, consisting of molten lava, sulphur banks, the deep pit craters, etc., to many the interesting forest growth will hold a close second place. In the region of the volcano of Kilauea there is a rapid transition from the dense, boggy, wet rain forest, replete with the picturesque giant tree ferns and palms, to a semi-wet forest of rather shrubby or stunted vegetation which gradually dwindles away until only the dry barren lava flow deserts possess the land.

At the edge of this semi-wet forest there are areas called *kipukas*, which are virtually islands of black, fertile soil surrounded by comparatively recent lava flows. These *kipukas* are

very rich in tree species and indicate a type of forest which at a former period covered the land before destructive lava flows from Mauna Loa removed it.

Among the most interesting of these and only three miles west from the Volcano House at the edge of Kilauea is Kipuka Puaulu, on the trail to Mauna Loa, comprising over 50 acres of rich soil surrounded by rough *aa* lava flows. Here, in this veritable botanical oasis, situated at about 4,000 feet above the sea, may be found a forest similar to that in the dry forest of the lower forest zone and in addition many unique and rare species of trees. One may readily escape from the wet climate of the Volcano House and spend in this drier spot many profitable hours drinking in the varied woodland scenes in this beautiful park-like forest, studying the rare representatives of the botanical world, or simply listening to the sweet singing indigenous Hawaiian birds as they flash in and out of the sunlight in quest of insects or nectar.

If you are fortunate you will see the rare combination of the scarlet *apapane* as he rests on the orange-yellow blossoms of the *mamani* tree, or is scarcely distinguishable as he hovers about the red blossoms of the *ohia*.

To my mind, true lovers of nature who are soon satisfied with the spectacular, will seek out this charming tree garden and spend the larger part of their time there with profit and keen enjoyment.

Another smaller but curious spot supports a grove of *koa* trees away out in the sterile desert about two and one-half miles southeast of the lava lake. How the seven *koa* trees came to establish themselves there, so many miles away from any of their fellows, is hard to explain, but the grateful shade of this *koa* oasis is a welcome spot to reach when one has spent most of the day on the hot desert looking for pit craters and other volcanic formations or searching for solidified raindrops or human footprints made in the fresh ash deposits a century ago.

The more one studies into the forest trees of this region, the more interesting the subject becomes, for here one may find the trees producing the timber which the early Hawaiians depended upon for their house posts and beams, for their wooden utensils such as poi bowls and meat dishes, for their adze handles, fire sticks, surf boards, canoes and idols. From certain trees they used the bark for their paper cloth, from the bark of others they made strong twine for their fish nets and even used a poisonous bark for stupefying fish. Other trees furnished perfume and a sticky substance for snaring forest birds, whose feathers were used in making the royal capes, and still others furnished various dyes for coloring their paper cloth. From the tree fern *pulu* stuffing for pillows and mattresses in later years was obtained.

To the newcomer these trees are all so strange that it seems a





The koa oasis in the Kau Desert, Kilauea Section of the  
Hawaii National Park.



difficult task to recognize any of them. Only three will appear at all familiar and these are the Hawaiian holly, hydrangea, and heather.

The task of identification is, moreover, made more burdensome by the fine distinctions which the systematic botanists have made in classifying the trees. A new species or a new variety may be made of a tree simply because the leaf is hairy instead of smooth. Those engaged in working out these details have my sympathy, and to assist them in learning more about these interesting trees in the National Park near Kilauea I have prepared the following list of trees to be found there with a brief popular description of each.

This list is not claimed to be complete because of the difficulty of identification due to the complexity mentioned above, but it will serve to assist the beginner in making a start in the right direction. As reference books, Rock's "The Indigenous Trees of the Hawaiian Islands" and Hillebrand's "Flora of the Hawaiian Islands" are recommended.

#### LIST OF TREES IN THE KILAUEA SECTION OF THE HAWAII NATIONAL PARK.

- AALII, *Dodonaea viscosa*. A small, stiff tree, often only a bush, with papery leaves. Readily distinguished by its fruit, which is a two-winged papery capsule, either bright red or pale yellow.
- AAWA HUA KUKUI, *Pittosporum Hosmeri longifolium*. A rather erect tree with smooth bark and leaves like the loquat. It is conspicuous for its fruit, about the size of a kukui nut, which is a woody, orange yellow capsule. The alala or native crow feeds on the oily seeds of this fruit.
- AE, *Xanthoxylum dipetalum geminicarpum*. A tree 40 feet high with stout, ungainly, erect branches. The bark is gray and covered with lenticels. The leaves are aromatic. Only two trees occur in Kipuka Puauhu.
- AE, *Xanthoxylum hawaiiense*. A medium sized tree with smooth tri-foliolate aromatic leaves.
- AE, *Xanthoxylum mawiense anceps*. A tree 20 feet high with tri-foliolate, hairy leaves.
- AIEA, *Nothocestrum longifolium*. A small tree, more often a shrub only 10 feet high, with slender ascending branches bearing whorls of thin leaves at the ends. The fruit is a small elongated orange-colored berry.
- AKIA, *Wikstroemia sandwicensis*. This becomes only a large bush with dark green leaves, black bark and small reddish fruit. The tough bark was used by the Hawaiians for rope and the leaves and bark, which are poisonous, were pounded and thrown into the water to stupefy fish.
- ALANI, *Pelea clausiacifolia*. A small tree with thick leathery leaves, often fragrant, belonging to a genus dedicated to *Pele*, the Hawaiian goddess of the volcano. The leaves, which occur in whorls of 4 or 3, are somewhat fragrant and have a prominent midrib. The fruit is a small 4-lobed green woody capsule.
- ALANI, *Pelea volcanica*. A tree up to 40 feet in height with oval, opposite leaves, hairy branches and very large, deeply parted green capsules.
- ALANI, *Pelea Zahlbruckneri*. A tree about 25 feet high, with large, oblong leaves and very large cuboid capsules which are scarcely even notched.

- HAPU, TREE FERN, *Cibotium Chamissoi*. The smaller of the two common tree ferns with the soft, yellow, glossy hair or *pulu* which was formerly used for stuffing pillows and mattresses.
- HAPU III, TREE FERN, *Cibotium Menziesii*. The larger tree fern with stiff, long, black hair on the leaf stems.
- HAU KUAHIWI, *Hibiscadelphus giffardianus*. A low, spreading tree like the *hau* of the seashore, but with uneven sided magenta flowers and large yellowish capsules. There is only one tree in existence and this, in a declining condition, is found on the Mauna Loa trail at the west end of Kipuka Puau.
- HOLEI, *Ochrosia sandwicensis*. A small tree growing to a height of 25 feet with long drooping branches, oblong dark green leaves arranged in whorls of from 3 to 4 with a milky juice, yellow double fruit and fragrant yellow blossoms. The natives extracted a yellow dye from the bark and roots.
- ILIAHI, SANDALWOOD, *Santalum paniculatum*. One of the smaller sandalwood trees attaining a height of only 25 feet. The thin leaves are overcast with a whitish bloom and the blossoms occur in densely flowered panicles.
- KAWAU, *Ilex sandwicensis*. The Hawaiian holly tree grows to a height of 40 feet, but often occurs as a stiff shrub. It is readily distinguished by its dark glossy leathery leaves, which show the impressed veins on their upper surfaces.
- KOA, *Acacia koa*. This is the most stately tree of the Hawaiian forest and may readily be recognized by its sickle-shaped leaves and large symmetrical crown when growing in the open. The true leaf of the koa is compound and is found on young trees and on young growth of older trees. The koa grows usually on well drained soils and comes next to ohia in numerical importance. It produces a very fine wood, which was used in ancient days for dugout canoes and surfboards and is now used for furniture and musical instruments and occasionally for interior finish.
- KOLEA, *Suttonia Lessertiana*. A common tall tree reaching 60 feet in height with a smooth gray bark. The leaves, which are very variable, are thick and leathery, with practically no stems, and are pink when young. The red sap which flows from injuries made in the bark was used by the Hawaiians for dyeing *tapa*.
- KOPIKO, *Straussia Hillebrandii*. A small tree with opposite leaves which are rounded at both ends, smooth and dark green on the upper surface and hairy beneath.
- MAMAKI, PAPER MULBERRY, *Pipturus albidus*. A small tree with rough leaves, usually having red veins and stem, but very variable in shape. The leaves are often riddled by insects. From the inner bark of this tree the Hawaiians made their *tapa* or paper cloth.
- MAMANI, *Sophora chrysophylla*. A sturdy tree with compound leaves belonging to the bean family. The pea-like blossoms are a bright yellow and the rough corky pod is deeply constricted between the seeds. The bark of the older trees is rough. The wood is very durable and makes excellent fence posts, but so hard that a special staple had to be manufactured for the use of this wood in fence construction.
- MANELE, A'E, *Sapindus saponaria*. A tall stately deciduous tree with compound leaves of a bright green color and an umbrella-like crown. The fruit consist of a sticky, parchment-like, brown covering enclosing a small round black seed which is used in bead work. Called "Soap-berry Tree."
- MANENA, *Pelea cinerea*. A medium sized tree with opposite leaves, which are thick and leathery. The young shoots and leaves are covered with fine grayish wooly hairs. The capsules are yellow and the trunk of the tree is covered with a smooth, pinkish-brown bark.





A common woodland scene in Kipuka Puauhi, Hawaii National Park.



- MAUA, *Xylosma Hillebrandii*. A small tree with shiny papery leaves, which have a scalloped margin. The small globose fruit is pointed at the end.
- NAIO, BASTARD SANDALWOOD, *Myoporum sandwicense*. A large tree with rather narrow leaves crowded toward the ends of the branches. The small white or pink fragrant blossoms are borne all along the slender branches. The fruit is like a small white, round, fleshy berry. The dark yellow wood is very hard and durable and has an even spicier smell than the true sandalwood.
- NAUPAKA, *Scaevola Chamissoniana*. A bush or small tree with light-green rough-margined leaves, white one-sided blossoms which appear to be only half a flower, and small black round fruit.
- OHAWAI, *Clermontia Hawaiiensis*. A small tree, often found growing on the trunks of tree ferns, with long narrow leaves clustered at the ends of the branches. The tubular blossom is purple, whitish or green, and the globular fruit is orange-yellow.
- OHELO, *Vaccinium penduliflorum*. The native high bush huckleberry which often attains the size of a small tree. It frequently is found growing on the trunks of other trees.
- OHIA, OHIA LEHUA, *Metrosideros collina polymorpha*. This is the commonest tree in the Hawaiian forest and varies greatly in the size and character of the leaves as well as in the shades of its tassel-like blossoms which range from a deep scarlet through salmon to a canary yellow. The tree attains a large size, has a scaly bark, and produces a very hard, close-grained wood.
- OLAPA, *Cheirodendron Gaudichaudii*. This is a large tree whose compound leaves composed of five leaflets are constantly in motion on account of the flattened stems. The leaves and bark have a strong resinous odor and the heavy clusters of fruit resemble elderberries.
- OLOMEA, *Perrottetia sandwicensis*. A small tree, whose leaves have red veins and stems. The bright red berries droop gracefully from the branches. The golden brown wood was rubbed with the *hau* to produce fire.
- OLOPUA, *Osmanthus sandwicensis*. This is the Hawaiian olive and may be recognized from its fruit, which closely resembles an elongated ripe olive. The smooth dull leaves vary greatly in shape and size. The tree attains a large size and the wood is extremely hard, close grained and durable. The wood was used by the Hawaiians for adze handles.
- OPUHE, *Urera sandwicensis*. A medium-sized tree with milky juice. The elongated leaves, which are pale beneath, have prominent, parallel veins. The fibrous bark was used by the Hawaiians for twine and for making paper cloth.
- PAPALA, *Charpentiera obovata*. A small upright tree which may be distinguished by its long thread-like bunches of flower stalks. The leaves are oval, leathery and smooth and have impressed straight parallel veins. The wood is very light and was used for Hawaiian fireworks, when lighted sticks were thrown from a high cliff.
- PAPALA KEPAU, *Pisonia inermis*. A low spreading tree with broad dark green, thin, tender, opposite leaves. It is readily distinguished by its long thin fruit, which is covered with a sticky substance which the Hawaiians used for bird catching. The wood is very soft and brittle and shrinks excessively in seasoning.
- PILO, *Coprosma montana*. A small tree with stiff branches and small leaves. The small ovoid fruit is reddish and is tipped at the end.

PUAHANUI, *Broussaisia arguta*. A luxuriant shrub which grows in the wet forest and often attains the proportions of a small tree. The opposite rough leaves closely resemble the *Hydrangea*, to which it is related, and the clusters of dark, red berries which form at the ends of the branches are the favorite food of native birds.

PUKEAWE, *Styphelia tameiameia*. This is the Hawaiian heather which sometimes grows into a small tree. The leaves are very small and the ends of branches are often covered with small dry, white, pink or red berries which are very decorative. The trunk is twisted and the wood is hard and heavy.



## DIVISION OF FORESTRY.

### REPORT OF SUPERINTENDENT OF FORESTRY, OCTOBER, 1921.

Honolulu, November 28, 1921.

Board of Commissioners of Agriculture and Forestry,  
Honolulu, T. H.

Gentlemen:

I respectfully submit the following report of the Division of Forestry for the month of October, 1921:

#### TREE PLANTING.

Trees were planted during October in forest reserves as follows: Luaualei Forest Reserve, Oahu, 42 red mahogany, 5,778 red gum, 12 lemon gum, 358 silk oak, 986 Australian flame tree (*Brachychiton acerifolium*), and 729 logwood; total, 7,905 trees. A soaking rain made conditions suitable for the resumption of tree planting in this region. In the Lihue-Koloa Forest Reserve, Kauai, on the government land of Kalaheo back of the Papapaholahola Spring Reserve, 149 lemon gum, 470 silk oak, 39 Australian red cedar and 233 swamp mahogany were planted; total 891 trees. Grand total for the month, 8,796 trees.

In preparation for the establishment of the chaulmoogra oil producing plantation, a first shipment of *Hydnocarpus anthelminticus* trees was sent to Waiahole as well as a quantity of koa trees for interplanting and lemon gum trees for a windbreak just inside the newly constructed boundary fence.

Mr. Angus McPhee has asked for 5,000 trees to be planted on Kahoolawe this December and Ranger Lindsay has been directed to have these ready and to supply them from the Haiku nursery.

#### CONIFEROUS TREE PLANTATION.

On October 9, while on Maui, I visited the experimental plantation of temperate zone trees established in 1910 by my predecessor at approximately 7,000 feet on the slopes of Haleakala. Here a number of pine, cedar, fir and spruce trees show good promise of success, the Coulter pine of California having attained a maximum height of 17 feet and a breast height diameter of 7½ inches in eleven years. The next in order showing the best growth are eastern white pine, incense cedar and Scotch pine and almost all are already bearing cones.

#### PUPUKEA PLANTING.

On October 27, I inspected the trees set out at Paumalu in the Pupukeya Forest Reserve, Oahu, under co-operative tree planting agreements with pineapple raisers and found the Australian red cedar, mahogany and koa trees planted in January, 1921, well cared for and already on the average four feet high. Plans are being made for continuing the planting in this reserve during the coming rainy season.

#### FOREST FENCING.

During the month the construction of a total of 1.71 miles of new fences on forest reserve boundaries was completed and a total of .98 mile of fences was repaired, making a grand total of 2.69 miles of fences receiving attention during the month.

At Waiahole, Oahu, the extension of the fence on the forest reserve

boundary to include the land recently acquired by the Land Commissioner from Mr. McCandless and added to the forest reserve and on which the chaulmoogra tree plantation will soon be established, was completed on October 19. The fence is 4,725 feet, or .89 mile, long and includes one watergate and a double gate across the wagon road leading up to the Waiahole tunnel. The whole of Waiahole Valley proper in the forest reserve is now adequately protected by a substantial stock proof fence. In the construction of the water gate and the fence, pickets and spreaders made from the silk oak (*Grevillea robusta*) and sawed up at the Makiki Nursery were used. They took the nails and staples well, and, being off the ground, should last for a long time. Just inside of this new fence, a double row of lemon gum trees will soon be planted, not only to mark the forest boundary so that it may be seen from afar, but also to give protection from the wind to the trees of the chaulmoogra plantation soon to be established there.

The other fence, completed on October 31, is a hogproof and cattle-proof fence built on the boundary of the Olaa Forest Reserve, Hawaii, near 24 Miles on the Volcano Road by S. Kanamori, the holder of a government lease. This fence, which was begun in June, is substantially built and is 4,319 feet or .82 mile in length. The builder will continue to construct in co-operation with this Division a stockproof fence on the boundary of this same reserve where it is adjacent to private land on which he holds a lease.

Incomplete reports indicate that several of the fences on Hawaii, required to be built under general lease or homestead agreement conditions, and to which the Land Commissioner's attention was called last August because of their poor condition or non-existence, have been constructed lately. These will be reported on more in detail in my report for November.

Repairs to reserve fences were made by Ranger Mackenzie and Lovell in the Olaa Forest Park Reserve, Sec. A, and in the Kealia and Moloaa Forest Reserves, respectively, and amounted to a total of 5,203 feet, or .98 mile of fences.

#### KULA FOREST RESERVE FENCE.

On October 10, in company with Mr. Kraebel, I made an inspection of the fence on the boundary of the Kula Forest Reserve, Maui, where it embraces the government land of Kamaole, and which is supposed to have been maintained in stockproof condition in accordance with certain terms in Land License No. 542, issued to the Raymond Ranch interests on September 20, 1902. Most of the old mamani posts on this fence line are almost completely rotted through and scarcely any section of it is stockproof. One slight touch on one of the posts resulted in the falling over of about 50 feet of the fence. The three smooth wires and two barbed wires are slackly stretched, making it possible for cattle to get through easily in a dozen or more places. In fact, the whole fence exemplified a flagrant subterfuge for a stockproof fence which is required to be constructed and maintained by a stringent clause in a government contract. Although the condition of the fence has repeatedly been called to the attention of the proper official during the past decade, it has been allowed to remain in this unstockproof condition.

I am glad to report, however, that after numerous conferences on the subject with the present Land Commissioner he has issued as of August 24, 1921, a new License for Right of Way, No. 1363, to the Board of Trustees for James H. and Phoebe K. Raymond, giving them the right to take their share (62.5%) of water of Polipoli Spring across the forest reserve lands and requiring them in turn to construct by December 23, 1921, and maintain on 2.6 miles of this boundary an American wire fence. With such a fence completed there should be no further trouble over cattle getting

into the Kula Forest Reserve, and tree planting can then be safely undertaken.

#### NEW FOREST RANGER.

Mr. Lawrence L. Peralto began his duties as forest ranger for the Hilo Forest Reserve on October 1, and during the month assisted Assistant Surveyor Hockley on the Piihonua survey and in co-operation with Ranger L. W. Bryan of the H. S. P. A. surveyed and marked on the ground the new Hilo Forest Reserve boundary between the land of Piihonua and Puna-hoa 2nd from the Wailuka River mauka to the point where the boundary crosses the latter land.

Ranger C. E. Stone returned from his vacation trip in the east and resumed his duties on the Kau Reserve, Hawaii, on October 10.

#### MOKULEIA RESERVE.

On October 3, I showed the main boundary pipes on the makai boundary of the Mokuleia Forest Reserve, Oahu, to Ranger V. L. Ellis and left with him a large supply of flags to be placed along this boundary, which is approximately 7 miles in length, in preparation for the fence building which I plan soon to undertake in co-operation with the owners of the adjacent private lands for the protection of the forest in this important reserve.

#### MAUI FAIR.

The fourth Maui County Fair was held in Kahului on October 13 to 15, and this Division was represented by an exhibit of trees, seeds, wood specimens, photographs of forest activities, and the customary working erosion model to demonstrate the purpose of forest protection. Of additional interest was a collection of freshly picked boughs of temperate zone pine, spruce and cedar, trees brought down from the experimental plantation on Haleakala. The exhibit attracted much attention and interest, and seemed to be much appreciated.

#### EDUCATING SOLDIERS.

As reported by the Forest Nurserymen, six enlisted men from different posts of the U. S. Army on Oahu were given instruction at the Government Nursery for a fortnight in the propagation of plants, transplanting of seedlings, mixing and sterilizing of soil, the general care of plants, and establishment of lawns. In this course of instruction, these soldiers gained considerable knowledge of nursery work and sufficient practical experience to enable them to be of greater service to the posts to which they are assigned.

#### CO-OPERATION WITH OUTDOOR CIRCLE.

Several conferences were held with the President of the Outdoor Circle on the subject of the proposed employment and duties of an expert street tree trimmer whom the street utilities companies are willing to finance. At the request of the President of the Outdoor Circle the royal poinciana tree at the corner of King Street and Kalakaua Avenue, which had been split to the ground by a storm, was chained together so as to prolong the existence of this familiar Honolulu landmark.

Respectfully submitted,  
C. S. JUDD,  
Superintendent of Forestry.

# REPORT OF ASSISTANT SUPERINTENDENT OF FORESTRY, OCTOBER, 1921.

November 9th, 1921.

Superintendent of Forestry,

Honolulu, H. T.

Dear Sir:

I respectfully submit the following routine statement of my work during October, 1921.

## MOKULEIA FOREST RESERVE.

On October 3, in company with the Superintendent of Forestry and Ranger Ellis, I visited the region of Kawaihapai in the Mokuleia Forest Reserve in order to flag the makai boundary and to determine the amount of fencing required to exclude stock from this reserve. Professor Gregory, of the Bishop Museum, accompanied us on the trip in pursuance of his continuous study of the geology of the Islands.

This semi-xerophytic "transition" forest, in which is found a more variegated arborescent flora than in any other Hawaiian forest type, has been exposed to grazing cattle for many years, and the continued recession of the forest makes its protection against stock an urgent matter. Hundreds of acres are already possessed, to the exclusion of everything else, by a thick growth of worthless lantana which flourishes everywhere in this region where the native ground cover has been destroyed. Steep slopes are eroded and deeply cut by innumerable cattle trails; in many places the sterile bed-rock is exposed by landslides which had their origin in such trails. Springs that were constant a few years ago are now permanently dry; streambeds which anciently held torrents, and even in later years regularly trickled small streams, have now been dry for several years. The entire region demonstrates the havoc that can be wrought by cattle in destroying this transition type of forest.

## MAUI COUNTY FAIR.

Approximately two weeks were spent in connection with the exhibit of the Board of Agriculture and Forestry at the Maui County Fair, held at Kahului on October 13, 14, 15. This exhibit, representing the activities of each Division of the Board, was considerably larger than the one of last year and proved highly attractive as well as instructive to the visiting crowds. In the Forestry section the rainfall-erosion model was again shown, a large pyramidal table exhibited more than fifty varieties of trees and plants and carried a diagrammatic poster explaining "How Trees Grow." Among the innovations were a very complete collection of tree seeds arranged by Mr. Haughs, a set of thirty photographic enlargements with explanatory legends giving a thorough exposition of "Forestry in Hawaii," a collection of plain and polished boards of the more important native and introduced woods cut from trees grown in Hawaii, and a novel collection of fresh boughs of pine, spruce, and cedar brought down from trees now growing in the federal experimental plots on Haleakala. Little blocks of true sandalwood, cut from trees in the forests of Oahu, and hundreds of packages of ornamental tree seeds were given to visitors at the Forestry exhibit. Large quantities of publications of the U. S. Department of Agriculture were also distributed.

## FEDERAL TREE-PLOTS ON HALEAKALA.

During my stay on Maui I made a thorough examination of the experimental plots of coniferous trees planted on Haleakala in 1909 and 1910 by the Division of Forestry in co-operation with the U. S. Forest Service.



Of the four plots located at 7000, 8000, 9000 feet, No. 1, at the lowest altitude, was the most successful both in rate of growth and in number of trees established. The species showing the best growth were Coulter pine, eastern white pine, incense cedar and Scotch pine. The results in the lower plots compare very favorably with the results found in similar plantations on Mauna Kea. A report is being prepared covering the entire experiment.

#### INSPECTIONS.

On October 9th, in company with the Superintendent of Forestry, I inspected the Haiku Nursery, in charge of Ranger James Lindsay, and also ascended Haleakala to examine Plot 1, of the experimental tree plots, and to collect specimens for display at the Maui Fair. On the 10th we made a trip of inspection to the south end of Kula Forest Reserve in the vicinity of Polipoli Spring. Here the boundary fences, which are required under lease terms to be maintained in stock-proof condition by adjacent ranches, were found to be in very poor condition. At several places distinct stock trails were found leading through the fence into the reserve, and on the slope below the spring within the reserve ten tame cattle were found.

#### ITALIAN CYPRESS STUDY.

From various localities on Maui I collected cones of the upright Italian cypress (*Cupressus sempervirens*) in the hope of finding a source of seed which will reproduce seedlings true to the parent form. Whether this tree crosses with *Cupressus macrocarpa*, which is abundant throughout Hawaii, or whether the upright form is not a constant, the fact remains that it is difficult to secure seed which can be depended upon to produce the upright form of tree. Even the seed obtained from commercial seedsmen is not dependable. Since this form of tree is always much in demand by Island people, it is very desirable to find a constant source of dependable seed.

I arrived at Kahului, Maui, on October 8, and left the island at Lahaina on October 24. The last week of the month was devoted to the compilation of data on the coniferous plantations and to the preparation of a brief news article on the growth of pine trees in Hawaii.

Respectfully submitted,

CHAS. J. KRAEBEL,

Assistant Superintendent of Forestry.

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#### REPORT OF THE FOREST NURSERYMAN, OCTOBER, 1921.

November 21, 1921.

Superintendent of Forestry,  
Honolulu, T. H.

Dear Sir:

I herewith submit a report of the work during the month of October:

#### NURSERY—DISTRIBUTION OF PLANTS.

The number of plants distributed, including those sent to forest reserves, are as follows:

Oahu:	In Trans-		Total.
	Seed Boxes.	plant Boxes.	
Sold .....	...	400	171
Gratis .....	500	250	1,211
			2,532

## SUB-NURSERIES.

	Seed Boxes.	In Trans- plant Boxes.	Pot Grown.	Total
Maui and Molokai.....	24,000	500	196	24,696
Kauai .....	8,000	891	100	8,991
Hawaii .....	3,000	2,246	80	5,326
				<u>39,013</u>
Total for all Islands.....				41,545

## COLLECTIONS—GOVERNMENT REALIZATIONS.

Sale of plants, Government Nursery, Honolulu.....	\$ 7.85
Allowance made by Castle & Cooke on breakage on shipment of glassware for Division of Entomology.....	3.39
Rent of Office Nursery Grounds, for August.....	35.00
Sale of plants, Hilo Nursery.....	6.90
Total . . . . .	<u>\$ 53.14</u>

PRESERVATION OF FOREST RESERVES.  
BLACK SAND.

13 loads of black sand taken from Makiki Valley Sand Pit at \$0.50 per load .....	<u>\$ 6.50</u>
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## ANIMAL INDUSTRY REVOLVING FUND.

Collections made under this heading amounted to.....	<u>\$129.60</u>
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## PLANTATION COMPANIES AND OTHER CORPORATIONS.

Distribution of plants from Government Nursery in Honolulu: 3150 in transplant boxes and 160 pot grown; total 3310.

At the request of Major White of Fort Shafter, the writer agreed to take on for two weeks six enlisted men from as many different posts for the purpose of giving them a chance to learn a few of the principal details in propagation, planting, etc. The work consisted of making and planting cuttings, transplanting trees, mixing and sterilizing soil, planting grass, making boxes, and attending to plants in pots and boxes. The six men did very well for the short time they were with us, and with a little more practice they no doubt, if allowed to stay by the job long enough, will be the means of improving the looks of the different posts which they are detailed to look after.

## MAKIKI STATION.

The work done at this station consisted of the regular routine with the exception that we had six enlisted men for two weeks who helped us considerably in the work mentioned above.

## HONOLULU WATERSHED.

The watershed gang has been clearing off brush at the bottom or makai end of Makiki Valley, in preparations for planting.

## ADVICE AND ASSISTANCE.

The writer made the following number of visits and otherwise gave advice and assistance as follows at the request of people in and around the City:

Visits made .....	5
Advice given people calling.....	6
Advice given by telephone .....	4

### MAUI FAIR.

At the request of the director of the Maui Fair, the writer consented to act as a judge of the flowers and plants, accordingly three days were spent on Maui.

For about two weeks before the fair, our time was taken up with sawing and getting ready wood specimens of 18 different kinds of wood. A log of sandal-wood which the writer got from Mr. William Harpham's at Waialua was cut into over 900 pieces,  $\frac{1}{4} \times 2 \times 2$ , and given out as souvenirs, each piece containing the Hawaiian and scientific names. All were cut up at our Makiki saw mill.

A large quantity of seed of a number of our best trees and vines were put up into packages and distributed free at the fair, each package being properly labeled.

A collection of seed put up in glass vials and enclosed in glass cases, all properly labeled, was put on exhibition.

A large number of labels required for the different specimens and the necessary work in filling the envelopes, etc., entailed a great deal of work, and I wish to state here that the assistance of the office staff who volunteered to help, consisting of Miss Kelly, Miss O'Dowda, and Miss Ruttman, did splendid work. I have no hesitancy in saying that without their help the work would not have been accomplished in time. I wish to thank each of the members of the office staff for their kindness in lending their help.

Respectfully submitted,

DAVID HAUGHS,

Forest Nurseryman.

## DIVISION OF ENTOMOLOGY.

### REPORT OF ENTOMOLOGIST, OCTOBER, 1921.

Honolulu, T. H., November 26, 1921.

Board of Commissioners of Agriculture and Forestry,

Honolulu, T. H.

Gentlemen:

During the month of October the insectary handled 10,600 pupae of the melon fly, from which there were bred 1,539 females and 1,370 males of *Opus fletcheri*.

The distribution of parasites was as follows:

#### MELON FRUIT PARASITES.

##### *Opus fletcheri*.

Oahu:	Females.	Males.
Moanalua Cucumber Field .....	600	600
Kalakaua Avenue Cucumber Field .....	450	450

#### FRUIT FLY PARASITES.

##### *Diachasma tryoni*.

Oahu:		
Mr. M. Kawahara, Kalihi Valley .....	350	350

*Diachasma fullawayi.*

Oahu:

Mr. H. Kawahara, Kalihi Valley..... 425 425

*Tetrastichus giffardianns.*

Oahu:

Mr. M. Kawahara, Kalihi Valley..... 2,000 ...

The colonies of the cabbage butterfly parasite, dung fly parasite, fern weevil parasite and corn leaf hopper parasite were maintained as usual and large numbers of a *Staphylinid* beetle *Creophilus erythrocephala* were reared and liberated also.

The Entomologist attended to the clearance and examination of a shipment of marcotted plants of *Ficus elastica* from India, with the fig insect of this species. Unfortunately, the plants failed to survive the long journey; at the time of receipt here the figs had all dropped from the withered stems and exit holes on the surface indicated that the insects had already emerged and disappeared. Two consignments of hornfly enemies were received from Mr. Osborn and handled at the H. S. P. A. Experiment Station quarantine room. Some of the insects were liberated and others held for multiplication.

It is a pleasure also to report that *Dirhinus giffardi*, one of the fruit fly parasites, has been recovered in Honolulu.

Respectfully submitted,

D. T. FULLAWAY.

Entomologist.

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## DIVISION OF PLANT INSPECTION.

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### REPORT OF CHIEF PLANT INSPECTOR, OCTOBER, 1921.

Honolulu, Hawaii, October 31, 1921.

Board of Commissioners of Agriculture and Forestry,  
Honolulu, Hawaii.

Gentlemen:

I herewith submit my report of the work carried on by the Division of Plant Inspection for the month of October, 1921, as follows:

During the month 42 vessels arrived at the Port of Honolulu, 28 of which carried vegetable matter and 3 came by way of the Canal. The following disposal was made of the various shipments:

	Lots.	Pkgs.
Passed as free from pests.....	1,994	35,988
Fumigated . . . . .	4	4
Burned . . . . .	95	95
Returned . . . . .	9	9
Total inspected . . . . .	2,102	36,096

Of these shipments 35,590 packages arrived as freight, 369 as baggage and 137 as mail.

### RICE AND BEAN SHIPMENTS.

16,044 bags of rice and 587 bags of beans from the U. S., and 4535 bags of rice and 2174 bags of beans from Japan arrived. All were passed as free from pests.



## PESTS INTERCEPTED.

Approximately 4396 pieces of baggage belonging to immigrants from foreign countries were examined, from which 36 lots of fruit and 24 lots of vegetables were seized and destroyed. A tabulated list of material intercepted other than the above mentioned fruits and vegetables follows:

*Australia.*

Oct. 29. 4 plant, baggage; burned. Prohibited.

*China.*

Oct. 1. 1 lot corn, baggage; burned. Prohibited.  
 " 7. 8 lots pomelo, baggage; burned. *Parlatoria zizyphus* and *Per-gandii*, *Hemichionaspis aspidistrae* and *Phomopsis citri*.  
 " 7. 1 Cactus plant, baggage; burned. Prohibited.  
 " 7. 1 lychee tree, baggage; burned. *Pseudococcus comstockii*.  
 " 11. 1 lot pomelo, baggage; burned, prohibited.  
 " 22. 1 lot tangerines, baggage; burned. *Pseudococcus comstockii*.  
 " 22. 1 lot sandpears, baggage; burned. *Pseudococcus comstockii*.  
 " 24. 1 lot tangerines, baggage; burned. *Cladosporium citri*.

*Japan.*

Oct. 7. 5 lots nuts, baggage; burned. Prohibited.  
 " 7. 1 lot sago palm, baggage; burned. Prohibited.  
 " 11. 2 lots oranges, baggage; burned. Prohibited.  
 " 11. 3 lots sandpears, baggage; burned. *Lepidosaphes ficus*.  
 " 11. 1 pkg. seed, mail; fumigated precautionary.  
 " 11. 1 lot corn, baggage; burned. Prohibited.

*Philippines.*

Oct. 1. 1 lot corn, baggage; burned. Prohibited.  
 " 1. 1 lot Paddy rice, baggage; burned. Prohibited.  
 " 1. 1 lot medicinal bark, mail; fumigated. Precautionary.  
 " 7. 1 pkg. tree seed, mail. Williams to H.S.P.A.; fumigated; prec.  
 " 11. 1 pkg. paddy rice, mail; burned. Prohibited.  
 " 19. 1 pkg. paddy rice, mail; burned. Prohibited.

*United States.*

Oct. 4. 5 cs. peaches, cargo; returned. Wormy.  
 " 10. 1 pkg. chestnuts, mail; fumigated. Chestnut weevils.

## BENEFICIAL INSECTS.

Oct. 2. 4 cs. plants—*Ficus elastica*—for Board of Agriculture and Forestry from Indian Government. All dead. Found 5 species caterpillars, 3 species moths, several beetles, 1 cockroach, 15 white grubs. *Pseudococcus* sp., Earwigs, Centipeds, *Eulota* snail. Plants burned. Soil sterilized.  
 " 4. 1 pkg. beneficial insects from California to Mr. Fullaway.  
 " 19. 1 pkg. beneficial insects, Dung beetles, from California to Board of Agriculture and Forestry.

All were handled at the H. S. P. A. in the same manner as past shipments.

## HILO INSPECTION.

Brother Newell, Inspector at Hilo, reports the arrival of 11 steamers, with 8 carrying vegetable matter consisting of 161 lots and 4519 parcels. 8800 bags of rice from the mainland, 200 bags of rice and 130 bags of beans from Japan arrived and were passed.

## KAHULUI INSPECTION.

Mr. Louis Gillin, Inspector for Maui, reports the arrival of 7 vessels with 2 carrying vegetable matter. 37 lots and 7515 packages were inspected and passed as free from pests.

## INTER ISLAND INSPECTION.

47 vessels plying between Honolulu and other Island ports were attended and the following inspections made:

PASSED.		REJECTED.	
Taro . . . . .	354 bags	Plants . . . . .	35 pkgs.
Vegetables . . . . .	92 pkgs.	Vegetables . . . . .	1 pkg.
Fruit . . . . .	228 pkgs.		
Plants . . . . .	96 pkgs.		36 pkgs.
Pineshoots . . . . .	3,001 bags		
Seeds . . . . .	6 pkgs.		
	<hr/>		
	3,777		

## LOCAL FUMIGATION.

During the month we fumigated for various local firms the following:

690 bags corn.  
310 bags rice.  
41 bags barley.

## APPENDIX.

On October 10 I left for Kahului to represent the Divisions of Entomology and Plant Inspection at the Maui Fair. Our exhibit was a combination affair and attracted many visitors. Much information regarding injurious pests was given and the necessity of plant inspection was thoroughly demonstrated by various exhibits showing dangerous pests which were taken on plants and in soil arriving from foreign countries.

Early in the month we received the first declaration blanks for carrying out Notice of Quarantine No. 51 of the Federal Horticultural Board pertaining to Coastwise baggage inspection. Notice was sent to those Steamship Companies of coastwise steamers carrying passengers from Pacific Coast ports, with a copy of the regulations and a sample of the baggage declaration. The Purser of each steamer will be furnished the necessary blanks for baggage declaration and already several returning steamers are so furnished. Arrangement has also been made with the U. S. Public Health service and the Collector of Port to assist our inspectors in transportation to and from incoming vessels as they arrive off port, so that as far as we now can judge, all will be in readiness to carry out the new Federal Regulation.

Respectfully submitted,

E. M. EHRHORN,  
Chief Plant Inspector.

## DIVISION OF ANIMAL INDUSTRY.

### REPORT OF TERRITORIAL VETERINARIAN, OCTOBER, 1921.

Honolulu, November 19, 1921.

Board of Commissioners of Agriculture and Forestry.

Honolulu, T. H.

Gentlemen:

I have the honor to submit the following report on the work of the Division of Animal Industry for the month of October, 1921:

#### TUBERCULOSIS CONTROL.

A total of 528 head of cattle scattered in 37 dairies were tested during the month, out of which number 9 were condemned.

As mentioned in my last report, certificates of health are issued from this office to all milk producers. The effect of this on the sanitation of the different dairies was immediate and in two weeks time one hundred per cent improvement was noticed.

If this improvement is to be maintained and brought up to the highest point, co-operation by the Milk Inspection Department of the City and County is necessary, but efficient co-operation cannot be carried on with a department subject to the sudden changes incident to political chicanery. In all fairness to the producer and the milk consuming public, dairy and milk inspection should be taken out of the realm of politics and placed on a more permanent and efficient foundation.

#### INFECTIOUS DISEASES.

Hemorrhagic septicemia among swine and cattle have constituted the bulk of the work of this Division during the past month. A disinclination on the part of hog owners, especially the orientals, to report sickness among their animals until the disease is well advanced, is responsible for the continuance of these diseases and the high mortality connected with the various outbreaks.

It is highly desirable that a systematic inspection of hog raising establishments throughout the Territory be inaugurated, but available appropriations do not admit of this.

Only through the prompt report by owners of sickness among their animals can this department hope to limit the loss and efficiently control outbreaks of the above mentioned diseases.

#### HAWAII.

From East Hawaii, Dr. Elliot reports as follows:

##### *Port Inspections.*

Steamship Enterprise, San Francisco:

4 cows, 1 goat and 7 ets. of poultry.

Steamship Mauna Kea to Honolulu:

5 cows, 3 calves.

#### TUBERCULOSIS CONTROL.

A total of 115 head of cattle scattered in 35 dairies were tested during the month, out of which number one reacted and was condemned.

#### INFECTIOUS DISEASES.

A small outbreak of hemorrhagic septicemia occurred on one of the ranches with a loss of 3 head. In-contact animals were vaccinated. No loss has been reported since.

From West Hawaii Dr. Rowat reports the testing of 29 head of cattle located in four dairies with one reactor.

An outbreak of swine plague or hemorrhagic septicemia occurred on one of the big ranches, resulting in considerable loss. Vaccination was resorted to and, as no further reports have come in, Dr. Rowat considers that the outbreak has been checked.

#### MAUI.

Dr. Fitzgerald reports several outbreaks of hemorrhagic septicemia among cattle and hogs. A total of 528 animals were vaccinated in connection with these outbreaks. The loss was not reported.

This work has held up for the time being the tuberculin testing on this island.

#### KAUAI.

Dr. Golding reports that nothing of a serious nature has occurred on Kauai during the past month.

The tuberculosis control work has been held up awaiting a fresh supply of ear tags.

Respectfully submitted,

LEONARD N. CASE,

Territorial Veterinarian.

### REPORT OF ASSISTANT TERRITORIAL VETERINARIAN, OCTOBER, 1921.

November 18, 1921.

Dr. Leonard N. Case,  
Territorial Veterinarian, Board of Agriculture and Forestry,  
Honolulu, H. T.

Dear Sir:

I beg to submit the following report for the month of October, 1921:

#### TUBERCULOSIS CONTROL.

During the month of October, 528 head of dairy cattle were subjected to the tuberculin test. Of this number, nine were condemned and branded as reactors.

#### RABIES CONTROL.

Four dogs received at the Quarantine Station were given the Anti-Rabies vaccination.

#### LIVE STOCK IMPORTATIONS.

Of the eleven steamers inspected six brought the following live stock to this port:

Dogs, 4; horses, 2; coops of poultry, 157.

#### MAUI COUNTY FAIR.

I left Honolulu October 12, 1921, for Maui as representative in charge of the exhibit of the Division of Animal Industry, returning October 19, 1921.



Our exhibit consisted of ten specimen jars containing tuberculous lesions in various organs obtained from dairy cattle condemned under our tuberculosis control work; specimens of lesions occurring in hemorrhagic septicemia of hogs and cattle and a wall map giving the various animal diseases in the United States and the amount of loss occasioned by them; the animal diseases in the Territory and their reduction due to quarantine and other preventive measures taken by this department.

The exhibit was small and probably of particular interest only to stock and dairy men and those directly interested in the eradication of infectious diseases of animals.

I visited all departments and saw the exhibits, but naturally the live stock and agriculture sections were of greater interest to me than the others.

The exhibit of home grown and milled stock feed was particularly interesting.

There were feeds for dairy and beef animals, pigs, chickens, horses and mules, practically all the ingredients of which were home products.

It certainly looks as though Hawaii could be self-supporting as far as the live-stock industry goes, if it became necessary.

In the live-stock division the beef breeds were represented by Herefords and Angus, the dairy breeds by the Holstein and Ayreshire and Jersey.

The Hereford exhibit was greatly strengthened this year by a large and select entry from the Parker Ranch, Hawaii.

The dairy classes were strongest in Holstein and Ayreshire cattle and showed some individuals of great merit.

The boys' and girls' pig club indicated that Maui is trying to encourage a greater interest in the breeding and raising of more and better live stock among its youngsters.

Entries in the various horse classes were rather small, but showed good quality. The classes for draft brood mares and foals demonstrated that we can raise as good drafters here as they can anywhere, given the proper foundation stock and intelligence in care and feeding.

One of the greatest surprises I experienced was in the poultry show. The entries were large, varied and of extremely good quality. I had no idea we had such a variety of domesticated fowl in the Territory.

The management of the live-stock department could hardly be improved upon. Judging was conducted smoothly, without interruption or delay, and in a manner satisfactory to audience and exhibitors alike.

Indeed, the entire fair showed that the men responsible for the various departments worked hard to make it a great success, and I think they succeeded.

Respectfully submitted,

L. E. CASE,

Assistant Territorial Veterinarian.





$$\frac{14}{3} \approx 4.666$$



